Project implementers' perspectives on the deployment and uptake of Information Communication Technology for Development initiatives.

Presented by

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Minor dissertation

Submitted in partial fulfilment of the requirements for the degree

Master's in Commerce

in

Business Management

at the

College of business and economics

UNIVERSITY OF JOHANNESBURG

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2019

Declaration

I certify that the minor dissertation submitted by me for the degree Masters of Commerce (Applied Information Systems) at the University of Johannesburg is my independent work and has not been submitted by me for a degree at another university.

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Abstract

The implementation of Information Communication Technology for Development (ICT4D) is increasing through the introduction of various projects. The main aim of this research study was to explore the perception of the project implementers on factors that affect uptake and deployment of ICT4D projects in a South African based organization namely, Digify Africa. A qualitative research method was utilized. In-depth interviews were conducted with the Digify Africa project managers. The findings from the interviews revealed that the main factors of ICT4D project uptake and deployment at Digify Africa were: 1. Social contextualization, 2. Funding from donors because most projects relied on external funding 3. Collaboration because in all the projects the project managers worked with other organizations. The limitations of the study included the following: This data was collected from four project managers who were in charge of the implementations of the ICT4D project this may yield biased information; This is a cross-sectional research, therefore there are time constraints because the research was conducted in a short period. The findings of the study are valuable for project managers in the future adoption of ICT4D projects. The future research recommended was a study emphasizing the importance and the benefits of ICT4D, which is a very wide discipline. Lately, there has been a rise in micro jobs through online platforms. A research in the influences and challenges of these online platforms in the South African context would be important because online micro-jobs create a new job market.

Keywords: ICT4D, Participative Development, Contextualization, Digital Training

Acknowledgements

- Firstly, I would like to thank God, the Father of my Lord Jesus Christ for the strength, which He gave me during this period. Without You, I wouldn't have managed to finish this dissertation.
- My parents, dad Green and mom Lynette-Uyafha. Mum, I thank you for the support you have given me during my studies. Your love and patience for me has been amazing. For this, I want to say thank you. Dad thank you for the academic support your insight was very valuable to me.
- My siblings, you are the best. Silethokuhle, Artwell and Henrietta. You gave me courage, you are my inspiration and you motivate me to keep going. To the rest of my family members, thank you for the direct and indirect support throughout my studies.
- My supervisor Stella Bvuma. Words are just not enough, you are the best supervisor. I want to say thank you for your patience, for the passion you showed towards me. Your patience and the encouragement you gave me motivated me to keep on running even when it was tough for me.
- Digify Africa, I would like to thank the Director for allowing me to conduct research within the organization. The project managers who participated. Thank you for allowing me to conduct the interviews with you. I am so grateful.

Acronyms

AISI	African Information Society Initiative
CA	Capability approach
CF	The Cube Framework
ICT	Information Communication Technology
ICT4D	Information Communication Technology for Development
IDG	International Development Goals
INGOs	International Non-Governmental Organization
IT	Information Technology
K4D	Knowledge for Development
MDGs	Millennium Development Goals
NGOs	Non-governmental Organizations
PD	Participative Development
PEU	Perceived Ease of Use
PU	Perceived Usefulness
SAP	Applications and Products
SDG	Sustainable Development Goals
SMME	Small, Medium and Micro-sized Enterprises
TAM	Technology Acceptance Model
UN	United Nations

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

The uptake and deployment of Information Communication Technology for Development (ICT4D) is growing through the introduction of various projects. Several ICT4D projects which focus on different issues that range from education to health have been initiated around the world including South Africa (Manara & Gelderblom, 2016). Several research articles focus on the adoption by the beneficiaries to enhance success of ICT4D.

This research study explored the factors affecting the uptake and deployment of ICT4D projects in a South African based organization namely, Digify Africa. The organization uses several initiatives to bridge the digital divide gap with the main focus being to address socio-economic challenges such as unemployment in African countries. Digify Africa employs project managers whose role is to plan, implement and assess the ICT4D projects. In this study, four project managers were identified and participated in the research to allow the researcher to obtain comprehensive information about ICT4D projects adopted by Digify Africa.

The uptake and deployment of ICT4D focuses on the implementation of the ICT4D projects and the perception of the initiators regarding the intended benefits of the initiatives for the beneficiaries. In that regard, the success of ICT4D was indicated through a project's sustainability (Marais & Meyer, 2015). Walton and Heeks (2011) state that success is evident when the ICT4D solution is relevant to the context, secondly when the beneficiaries are up skilled and when the ICT4D solution is sustainable. In the context of this study, the ICT4D project success is evident when the benefits of the ICT4D are realized and the technological skills are utilized. Sustainability, in this case, is defined as a long-term and continuous benefit of the initiatives (Mabila, Van Biljon & Herselman, 2017).

1.2 Research background

According to Asongu and Le Roux (2017), an economy that is advanced through Information Communication Technology (ICT) is significant for social growth in South Africa (SA) where poverty, joblessness, and illiteracy are predominant. South Africa like other developing countries is still plagued by several socio-economic issues such as unemployment, poverty, crime and more (Joseph, 2013). Stats SA (2019) records 27.6% unemployment rate for the first quarter of 2019 (excluding discouraged employment seekers), 49.2% poverty rate, a poverty gap of 27.9%, and 55.1% for upper secondary education from age of 15 years and up. Due to the rise of the use of ICT some communities and countries have realized the

importance of using these to address socio-economic issues. As such, several ICT4D initiatives and projects have mushroomed in several areas including rural areas, townships and the urban areas (Ramadani, Kurnia & Breidbach, 2018). ICT4D is important for economic activities in South Africa, especially with regards to addressing socio-economic issues such as unemployment. In that regard, the success of these initiatives was important. This research was conducted to explore the factors that affect the uptake and deployment of ICT4D projects at Digify Africa. The research was conducted from the perspective of the project managers.

The research was based on ICT4D projects initiated by a non-profit organization called Digify Africa, formerly known as Livity Africa. Digify Africa's main objective was to reduce the digital divide in Africa (Digify Africa, 2018). The organization offers learning programs to equip individuals with digital skills. Those who benefitted include employees of companies, the unemployed as well as entrepreneurs (Digify Africa, 2018). Digify Africa implements projects in different African countries including South Africa, Nigeria, Zimbabwe and other countries (Digify Africa, 2018).

The organization was launched in 2014 when the lack of access to basic digital skills was identified in most African countries (Digify Africa, 2018). The vision for Digify Africa was to ensure that the youth in Africa were benefiting from the digital economy and have sustainable livelihoods (Digify Africa, 2018). In addition, Digify Africa hoped to ensure that the youth seize the opportunities emerging from the economies (Digify Africa, 2018).

Digify Africa had several projects, which equipped entrepreneurs, artists, employees as well as the unemployed (Digify, 2018). They also worked with several organizations, which include Google, Facebook, the British Council and other organizations (Digify, 2018). The research conducted was based on four different ICT4D initiatives implemented by Digify Africa.

1.3 PROBLEM STATEMENT

ICT4D projects are regarded as solutions to economic and social issues, nevertheless, these initiatives may not accomplish the envisioned transformation (Karanasios & Allen, 2013; Lin & Myers, 2015; Nipo, Bujang & Ting, 2014; Ramadani *et al.*, 2018). Several research papers address research adoption from the perspective of the beneficiaries and rarely a look into the initiators' perspectives. Therefore, there is a need to study the deployment and uptake of the ICT4D initiatives from the implementers' perspective to understand their perceptions when they implement the ICT4D initiatives. The challenge in ICT4D projects is that there is a gap between the implementers' perspectives in the uptake and deployment of ICT4D and

the beneficiaries' perspectives. Through this research the perspectives of the beneficiaries from the literature review will be compared to the implementers' perspectives from the actual research using the conceptual framework. This research is therefore important in aligning implementers' perspectives with the expectations of the beneficiaries.

1.4 Aim of the study

The main purpose of the study was to explore the uptake and deployment of ICT4D projects from the ICT4D project implementers' perspective to provide an outline for ICT4D project implementation and to explore if the initiators' perspectives are aligned to the beneficiaries' perspectives. The uptake and deployment of an ICT4D project was assessed by obtaining the implementers' perspective on the planning, implementation and outcomes of the projects they deployed.

1.5 Main research question

What are the factors affecting ICT4D projects uptake and deployment at Digify Africa from the implementers' perspectives?

1.6 Research questions

The following are the research sub-questions:

- What are project implementers' perspectives about the factors that should be considered when evaluating the success of an ICT4D project?
- What are the outcomes of the ICT4D project for the recipients?
- What were the challenges and lessons learnt in implementing the ICT4D projects?
- What are the beneficiaries' socio-economic gaps that still need to be filled?

1.7 Research objectives

- To explore the aims of the implementers in the uptake and deployment of an ICT4D project.
- To explore the project implementers' perspective about the factors that should be considered to evaluate the success of an ICT4D project.
- To explore the outcomes of the ICT4D project for the recipients.
- To explore the challenges and the lessons learnt in implementing the project.
- To explore the socio-economic gaps that still need to be filled.

1.8 Relevance of the research

This research was conducted to explore the factors affecting ICT4D project uptake and deployment to assist future ICT4D implementers in giving them guidelines for the implementation of ICT4D projects. It is important to explore the factors affecting uptake and deployment of ICT4D projects to have insight to implement the projects. Lin and Myers (2015) conducted a study where they found that a number of ICT4D projects, seemed to be successful, but did not deliver sustainable benefits for the targeted beneficiaries. Moreover, the benefits of the projects were not apparent to the beneficiaries. The question, therefore, is did the projects result in a sustainable transformation in the communities where they were implemented or did their target beneficiaries observe any benefits. Therefore, this study was conducted to explore if this was the case at Digify Africa. Furthermore, this study provided insight into the perceived benefits of the ICT4D initiatives carried out in the South African organization. The research, therefore, contributed to gaining a comprehensive understanding of the factors affecting ICT4D uptake and deployment. Moreover, through this study, the project managers would gain knowledge of ICT4D project implementation to offer sustainable benefits for the previously disadvantaged people.

1.9 Research design

The philosophical paradigm of this study was the interpretivism approach. According to Saunders, Lewis, and Thornhill (2016), interpretivism is the perception that individuals interpret situations of the world based on their own definitions and experiences. This study explored the opinion of the project managers from Digify Africa about the ICT4D projects they executed. The opinions expressed during the interviews were neither true nor false and could not be verified, therefore they were subjective. Interviews were conducted to obtain the project managers' opinions. The views were subjective because each project manager spoke from their own experiences and perspectives.

The deductive approach was realized for this study. A deductive approach is when current theoretical insights are verified (Creswell, 2014). The deductive approach was used because existing literature and theories regarding the adoption of ICT4D projects exist. The findings from the case study were compared to the literature review.

Qualitative research was utilized to gather, analyze and interpret data. Qualitative research is a non-standardized, comprehensive technique of collecting, analyzing and interpreting data (Creswell, 2014: Saunders *et al.*, 2016). The method of data collection used was in-depth interviews. The research explored the benefits and the factors affecting ICT4D

projects uptake and deployment from the perceptions and the experiences of the project managers of Digify Africa.

A single case study approach was utilized because the study was conducted at Digify Africa only. The cross-sectional time horizon was used because the project managers were interviewed within a short space of time of less than a month.

1.10 Limitations

- The research was based on interviews with four project managers who were selected using convenience sampling, which according to Yin (2012) may yield incomplete data.
- Cross-sectional research was used, therefore, there were time constraints because the research was conducted over a short period of time
- Member checking was not conducted due to time constraints. The project managers who were available for the interviews were approached.

1.11 Layout of the dissertation

This study comprised five chapters. The dissertation layout is as follows:

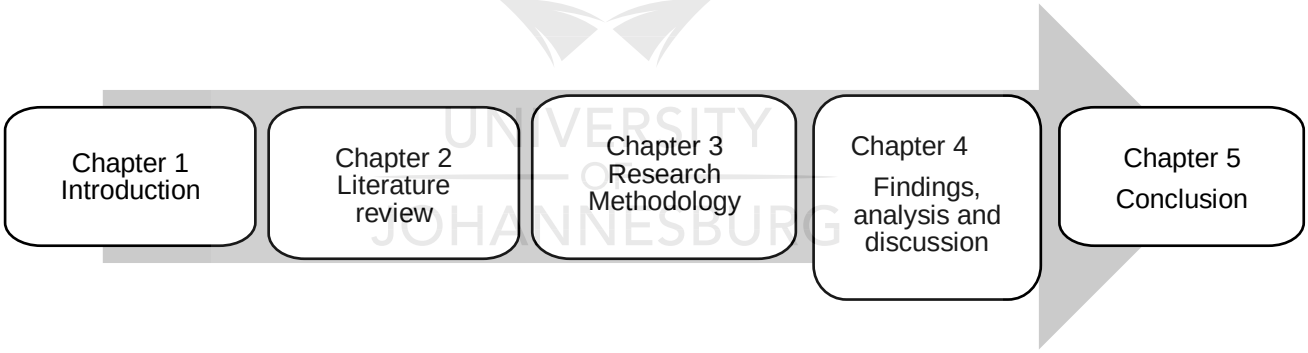


Figure 1.1. Dissertation layout

The chapters are summarized below:

Chapter 2: Literature review

The purpose of Chapter 2 was to explore existing literature about ICT4D projects and their adoption.

Chapter 3: Research methodology

This chapter described the research design and techniques used to obtain and analyze data as well as the validity of the study.

Chapter 4: Findings and analysis

This chapter provided the data analysis results and findings of the study.

Chapter 5: Conclusion

Conclusions and recommendations for future research were presented.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review is pertinent in providing the groundwork for the research. Since this research was deductive it will provide the theory to compare with the findings. The overall objective of this Chapter was to present various studies related to ICT4D projects adoption. Firstly, the context of the study is presented .Secondly, a brief historical background on ICT4D is presented. Thirdly, definitions of the key concepts relating to ICT4D are relayed. Fourthly, the analysis of ICT4D projects implementation in South Africa is discussed. Fifthly, the determinants of ICT4D projects adoption are described. Sixthly, the frameworks used to implement and assess ICT4D projects adoption are presented. Seventhly, the conceptual framework is presented. Lastly, a conclusion is presented to summarize Chapter 2.

2.2 Context of the study: Digify Africa

The information was obtained from Digify Africa (2018) and the Digify Africa Linkedin page. Digify Africa is a Non-Profit-Organization that is centrally operated in Melville Johannesburg. The organization only has one branch; however, the organization has a nationwide footprint because they conduct digital training in several locations in South Africa. Moreover, the company has implemented projects in the other parts of Africa. The digital skills offered involve the use of social media for marketing purposes. They focus on equipping the youth with accessible skills, which are through the social media platforms because a large number of people have access to social media.

Digify Africa offers the youth digital skills for different purposes. The services of the company are media, social media, content creation, digital advertising, youth training and internship programs, digital media, digital campaigns, and vocational training. Digify Africa has 11-50 employees. The organization operates in two ways: through the academy and through the network.

Through the academy, Digify Africa trains the youth on digital skills that will assist them in their careers or businesses. The organization's focus is digital marketing which is usually training the youth to use social media platforms such as Facebook, Twitter and Instagram for advertising businesses. The network operation on the other hand is utilized to give clients with youth focus services such as content production, digital campaigns and other services.

The general structure of Digify Africa is generally flat where Project Managers and their team make decisions autonomously. This was evident through the research conducted. The

company is participating in transformation which is evident in the employment of 92% women. Hence the project managers interviewed for the purposes of this research were all women. The organization worked on various projects over the years, for this research the focus was on the projects that are ongoing and/ or are recent.

2.3 Historical background of ICT4D

This study was partly based on the uptake of ICT4D projects; therefore, this section is used to provide information for the implementation of ICT4D projects over different phases. The implementation of ICT4D projects can be traced to as early as the 1950s (Heeks, 2008). However, the term ICT4D was first conceptualized in the 1990s (Dimagi, 2018; Heeks, 2009; Souter, 2016). Heeks (2009) stated that the concept can be traced back to the World Bank's report "Knowledge for Development".

2.3.1 ICT4D conceptualization

According to Joseph (2013), ICT4D is the positive outcome of technology and communication. Thomas, Li, and Oliveira (2017) on the other hand, defined ICT4D as the utilization of ICT to address socio-economic issues, particularly where resources are scarce. Walton (2013) concurred as he defined ICT4D as the deployment of ICT as the primary instrument to enhance growth in previously disadvantaged communities. According to Zheng, Hatakka, Sahay, and Andersson (2017), the other perceptions of ICT4D are beyond economic growth. This means there are wider perceptions of ICT4D, which would include social development, technological advancement, sharing of knowledge and other structural issues.

- Social Development: It advances the community where poverty and methods of communication are addressed (Indices of Social development, n.d). In this regard, this means ICT4D addresses social development.
- Technological advancement: When new technology is introduced to communities, for example, telecentres and tech hubs (Jiménez & Zheng, 2018).
- Sharing of knowledge: ICT4D is also evident when the ICTs are utilized for collaboration (Jiménez & Zheng, 2018).
- Structural issues: this perception is when ICT4D is utilized to address inequality, for example, to address the digital divide.

Gaur and Avison (2015) conceded and declared that ICT4D is an interaction of information, technology and development. Therefore, it is important to note ICT4D initiatives should not

measure success using technological and finance procedures only, but development factors as well. According to Gaur and Avison (2015), although several projects have been initiated, the development aspect is not realized due to poor management, resistance to change and complex power structures.

2.3.2 ICT4D eras

Heeks (2009) introduced different eras, which give an illustration of how ICT4D was adopted in different years. These eras are identified as ICT4D 0.0, ICT4D 1.0 and ICT4D 2.0. These phases are further adapted and explained by Mavengere and Ruohonen (2016). The eras are significant in illustrating how ICT4D was implemented over different periods of time. Table 2.1 depicts the different phases and the different components of each phase.

Table 2.1: ICT4D Phases and components

Components	**Phases/eras**			
	ICT4D 0.0	**ICT4D 1.0**	**ICT4D 2.0**	**ICT4D 3.0**
Iconic technology	PC database	Tele-centers	Mobile phones	Mobile phones
Adoption methods	Data processing	Content	Services and production	Participative development
The poor	Not identified	Consumers	Innovators and producers	Innovators and producers
Key goal	Organizational efficiency	MDGs	Growth and development	Participative development for growth
Key issue	Technology's potential	Readiness and availability	Uptake and impact	Collaboration
Key actor	Government	NGOs and donors	All sectors	Self-organized agents
Attitude	Ignore--→isolate	Idolize--→integrate	Integrate--→ innovation	er centered approach
Innovation model	Nothern	Propoor--→para poor	Para poor-→ per poor	Open-ended innovation process
Dominant discipline	Information systems	Informatics and development studies	Several disciplines	Several disciplines

Components	Phases/eras			
	ICT4D 0.0	**ICT4D 1.0**	**ICT4D 2.0**	**ICT4D 3.0**
Development paradigm	Modernisation	Human development	Development 2.0	Strategic openness-based

The components mentioned in Table 2.1 are explained as follows: The iconic technology is the main technology that was utilized and introduced in each phase (Mavengere & Ruohonen, 2016). Adoption methods illustrated how ICT4D projects were implemented in each phase (Mavengere & Ruohonen, 2016). The poor refers to the stakeholders who are identified as the ones who needed technology (Mavengere & Ruohonen, 2016). Key goal refers to the main objective while the key issue is the main societal gap during a certain phase (Mavengere & Ruohonen, 2016). The key factor refers to the main stakeholder who initiated the adoption of an ICT4D project (Mavengere & Ruohonen, 2016). Attitude refers to how ICT was perceived in each phase. Innovation model refers to the strategies used to introduce new ICTs. Dominant discipline is the academic departments that researched ICT4D and development paradigm is how the term "development" was perceived in each phase (Mavengere & Ruohonen, 2016).

Each of the phases illustrated in Table 2.1 is further explained in the section below.

2.3.2.1 ICT4D 0.0

In this era, there were two ICT4D implementation stages, one by the government followed by implementation in the business sector (Ojo, 2016b). According to Tas (2011), the focus was the use of computers and processing data in the government and the private sector. Moreover, Ojo (2016b) declared that application of the ICT4D projects during the 1960s was predominantly through sending print media and audio broadcasting to developing countries.

2.3.2.2 ICT4D 1.0

In this era, the term ICT4D was coined according to De´, Pal, Sethi, Reddy and Chitre (2018) and Souter (2016). As mentioned in Section 2.2.1 Heeks (2009) asserted that the phrase ICT4D was originally utilized by the World Bank.

The Internet and the Millennium Development Goals (MDGs) were developed during this period (Heeks, 2009). MDGs are goals, which were to be achieved to address inequality and other socio-economic issues (Lomazzi, Borisch & Laaser, 2014). Table 2.2 presents the eight goals:

Table 2.2: Millennium Development Goals (MDGs) (Source: Lomazzi *et al*, 2014:2)

MDG1	Eliminating extreme poverty and hunger.
MDG2	Accomplishing widespread primary training.
MDG3	Stimulating gender equality through the empowerment of women.
MDG4	Decreasing child loss.
MDG5	Improving maternal health.
MDG6	Combating HIV/AIDS, malaria and other diseases.
MDG7	Ensuring environmental sustainability
MDG8	Developing a global partnership for development.

According to Clarke, Wylie and Zomer (2013), the ICT4D in the projects was aimed at furthering the MDGs realization. The authors concluded that ICTs had a significant though limited role, in achieving the MDGs.The focus for most initiatives and projects was the implementation of ICT4D projects while disregarding the context (Heeks, 2009).

2.3.2.3 ICT4D 2.0

In this era, most projects centered on ICTs that were actually utilized, which means contexts are considered to ensure adoption of the ICT4D projects (Heeks, 2009). Emphasis is on intentionally building applications and business strategies that describe contexts of improvement (Heeks, 2009). Furthermore, the focus was on performing tasks on computers, and the electronic storage of information (Heeks, 2009). This meant the application of ICT4D provided people in developing countries with digital skills. The adoption of ICT4D projects in this period was not passive, innovation was actively pursued (Marais, 2011). Marais (2011) further stated that the technologies implemented were aimed at changing the procedures and structures of development.

2.3.2.4 ICT4D 3.0

Bon, Akkermans and Gordijin (2016) developed ICT4D 3.0. ICT4D 3.0 was based on three ideologies: the first principle is that the users of the ICT4D will set the goals and objectives; the second principle was that the systems and the technologies developed were introduced in collaboration with the targeted beneficiaries; the third principle was that the ICT developed was adaptive as it was applicable to the context. It should, therefore, be affordable to the

users, be compatible with the available infrastructure, and be aligned with the culture of the area. ICT4D 3.0 comprised of five components, which are recorded and described in Table 2.3:

Table 2.3: Components of ICT4D 3.0 (Source: Bon et al., 2016:88-89).

Component	Description
Context analysis	The ICT4D developers should be familiar with the areas and understand the background of the area in which the ICT4D will be implemented. The stakeholders should also gain knowledge of how the ICT4D will be implemented and what benefits it will bring.
Needs assessment	It is imperative to understand the needs of the users because the main goal is to develop services or products that will bring value to them.
Use cases and requirements analysis	Use of cases gives the users an insight of how the ICT4D will be implemented through the use of prototypes and mock-ups. Requirements analysis should also be conducted.
Sustainability assessment	A business model should be developed to ensure continuity of the project even when the implementers leave the community.
Developing testing, deploying	A working prototype should be developed and tested. The prototype should be evaluated and be improved on repetitively and adaptively.

There was a transition from an era where ICT4D adoption was evident when technology was utilized by the government and the private sector (ICT4D 0.0) to an era where NGOs utilized technologies to meet socio-economic needs (ICT4D 1.0). ICT4D 2.0 was about meeting the needs according to the available technology, which could be utilized by the targeted beneficiaries. Moreover, the beneficiaries were empowered to be innovative and self-sustainable.

According to Bon and Akkermans (2014) the features of ICT4D 3.0 are as discussed below:

- It is inclusive- The beneficiaries participate in the definition of the problem. Self-organization is also acknowledged.

- Adaptive- the system or ICT introduced is flexible allowing people with various backgrounds, personalities to use it. Moreover, it allows for continuous feedback.
- Discursive- It is comprehensive to accommodate the adaptability characteristic.
- Self-organized action supported- Beneficiaries and users' self-organization is supported and the introduction of the ICT4D is constructed based on the existing systems.

2.3.3 ICT4D research background

Activities of ICT4D are originally evident from the 1950s, however, literature about ICT4D is evident from the 1980s (Walsham, 2017). Initially, any literature on ICT4Ds concentrated in the adoption of ICTs in previously disadvantaged populations. Later research changed to concentrating on implementing sustainable ICTs, which were utilized by the communities for a longer period of time (Walsham, 2017). Moreover, research shifted from merely being conducted by information systems researchers to being conducted in different fields as depicted in Figure 2.1 below. These transitions were a result of the failure to implement ICT4D projects (Harris, 2016). Moreover, Harris (2016) stated that literature on ICT4D failed to provide solutions to socio-economic problems. Walsham, (2017) also stated that the focus of ICT4D literature was primarily about information systems. The research was initially evident in the Information Technology (IT) field and was later conducted in other disciplines which include humanitarian and computer science fields.

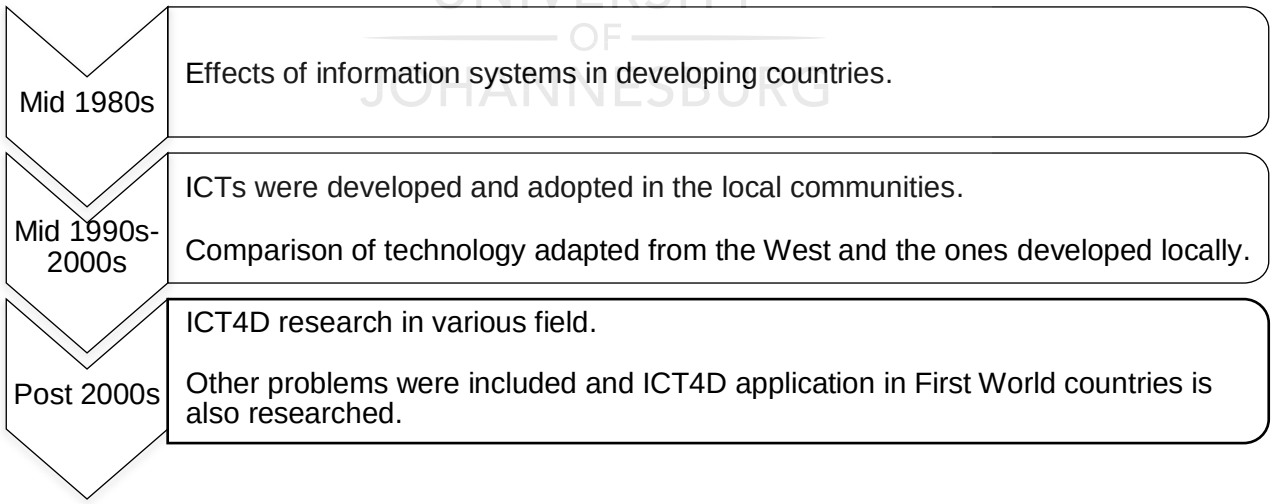


Figure 2.1 ICT4D enquiry phases (Source: Walsham, 2017)

2.4 Defining key concepts of ICT4D

2.4.1 Development

Gaur and Avison (2015) posited that development refers to issues such as welfare, improving the standard of living, poverty reduction, equality and enabling people to be self-sustainable. Andoh-Baidoo (2016) also referred to development as progress in the countries which are faced with problems of limited or lack of resources. Development can also be defined as:

> "…*vertical advancement where society moves from lesser to greater levels of energy efficiency, quality, complexity, comprehension, creativity, enjoyment, and accomplishment.*" (Palvia, Baqir & Nemati, 2018:161).

Sumner and Tribe cited by Zheng *et al.* (2017) summarized the term development into three categories. Two of the categories are a continuum: the achievements of short-term goals and the long-term achievement, which leads to sustainable transformation (Zheng *et al.*, 2017). The third category is the Westernization perspective, which Baelden and Van Audenhove (2015) referred to as modernization. This is when developed countries introduce ICT infrastructure in developing countries (Baelden & Van Audenhove, 2015; Zheng *et al.*, 2017). Modernisation occurs concurrently with short-term and long-term achievements. In essence, development can be viewed as short-term, long-term or as the modernization of developing countries.

The definitions of development are similar with very few variations. For the purpose of this research, development was defined as the long-term transformation in terms of alleviating poverty, reducing unemployment, improved education/literacy levels and increasing self-sustainability (Zheng *et al.*, 2017).

2.4.2 Information Communication Technologies (ICTs)

This is the use of infrastructure and components that enable people, organizations and communities to interact and distribute information (Rouse, 2011). Mbuyisa and Leonard (2017) defined ICTs as any equipment, method or knowledge used to capture, manipulate and store information. There are conflicting perceptions as to the role of ICTs in development as some researchers believe they were a solution to accelerate developing countries into the information age, while others believe ICTs will increase the digital divide (Mbuyisa & Leonard, 2017). The perception that ICTs increase the digital divide is because there are increased gaps in the use of technology as per the findings of Bornman (2016).

There may be potential to usher developing countries into the information age, however, due to economic issues it may be difficult for people to access communication devices.

According to Mbuyisa and Leonard (2017), ICT is comprised of four different components, which are hardware, software, data and infrastructure. These components of ICTs are depicted in Figure 2.2. Mbuyisa and Leonard (2017) summarize the components as follows:

- Software- programs used to operate the devices.
- Hardware- devices utilized for communication.
- Data- can be converted to information.
- Infrastructure- structures put in place to enable communication, for example fiber.

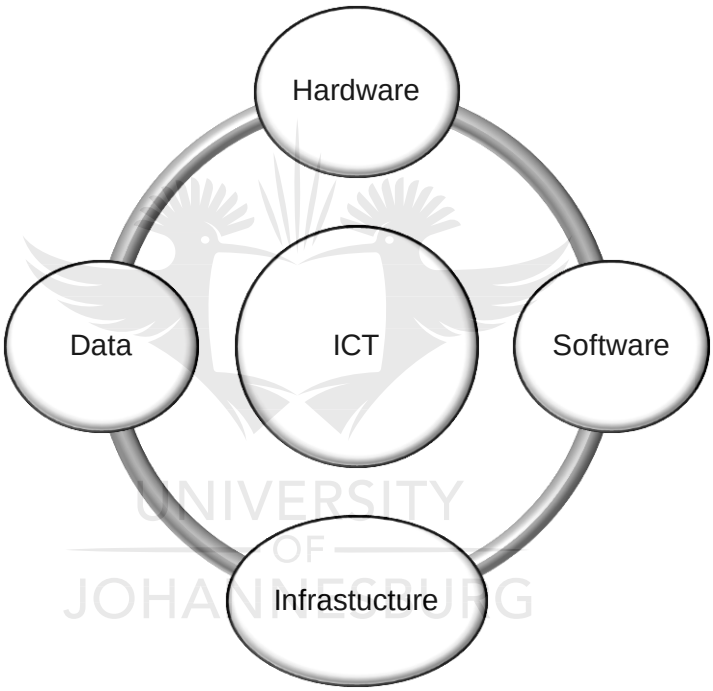


Figure 2.2. Components of ICT (Source: Mbuyisa & Leonard, 2017)

Digify Africa's projects were used all the components. The dominant component, however, is the data component because the beneficiaries are equipped with digital skills, this includes the use of social media data for marketing purposes.

2.4.3 ICT4D project success

Manara and Gelderblom (2016) asserted that the success factors for ICT4D projects are job creation and opportunities for innovation. Nevertheless, it is important to note the utilization of these factors as measures for success depends on the ICT4D project adapted and the goal of that initiative.

De' *et al.* (2018) stated that the issues that should be addressed to ensure success in ICT4D projects are: defining development and uncovering how ICTs can contribute to development; introducing ICTs that focus on the cultural needs of the society where it is to be adopted; and ensuring that the systems developed or introduced should be acceptable to the communities to ensure that there is no gap between the systems designed and their actual use. De' *et al.* (2018) further posited that the successful ICT4D project's process depends on good planning and the adoption of the project. There is also a need to gain an understanding of the community needs. Moreover, the targeted recipients must be able to use the systems that are introduced, therefore training is vital (De' *et al.,* 2018). The researcher explores if the ICT4D projects at Digify Africa made consideration these issues, which is depicted by the outcomes, challenges and the success factors.

Some of the successful ICT4D projects are accredited to sensible policies, information sharing, collaboration and optimistic outlooks (Musiyandaka, Ranga & Kiwa, 2013). Consequently, the system policies must be aligned with the setting in which the system is implemented. Furthermore, relationships/ partnership with all stakeholders are imperative and should result in positive attitudes, which would lead to the actual use of the systems or ICTs introduced. The success of an ICT4D is also determined by the use of the skills attained through the technology introduced (Kassongo, Tucker & Pather, 2018).

According to Rivett, (2017), implementation of the initiatives, as well as technologies, fail unless the beneficiaries are involved, therefore beneficiaries determine the success of the initiative. In this research study, the researcher will assess the projects using the success factors mentioned in this section.

2.5 ICT4D Implementation

According to Maail (2011), ICT4D projects are mainly initiated to improve communication, health, education and information in communities, and consequently lead to improved socio-economic status. According to Manara and Gelderblom (2016), the International Development Goals (IDG) and the Millennium Development Goals (MDG) were the main drivers for ICT4D projects implementation. MDGs, however, these were viewed to be limited therefore the Sustainable Development Goals (SDGs) were introduced in 2015. They were considered to be a roadmap to some ICT4D projects (Rothe, 2018). SDGs are goals set by the United Nations (UN) to address economic, environmental and social issues by 2030. There are 17 goals which can be summarized into the three pillars of sustainability which are: economic, social, as well as environmental issues. Through the findings, the researcher

will establish if the projects implemented at Digify Africa targeted any of the goals from these frameworks set by the UN.

According to De' *et al.* (2018), the implementation of ICT4D projects is affected by the initiators' perspectives of development. Rothe (2018) agreed with the notion and stated that ICT4D has transitioned with the revolution of the term development. Diaz, Andrade, Techatassanasoontorn and Singh (2017) and Maail, Kurnia and Chang (2017) further stated that the uptake of ICT4D has transitioned from addressing the digital divide to addressing the socio-technical divide. The digital divide according to Maail *et al.* (2017), was the introduction of an ICT infrastructure in places where there was none previously. The socio-technical approach focuses on the utilization of the ICTs rather than the introduction of the infrastructure only (Maail *et al.,* 2017). Moreover, the focus is on people and their needs (Maail *et al*., 2017). Aswani, Ilalvarasan, Kar and Vijayan (2018) have a differing perspective as they stated that the digital divide is addressed in several countries through the introduction of public Wi-Fi. In South Africa there several public Wi-Fi zones in cities such as Tshwane, Johannesburg and Cape Town (Mzekandaba, 2018).

Marais (2011) quoted Unwin, who stated that ICT4D initiatives are either motivated by social demands or market demands. According to Marais (2011), most ICT4D initiatives are motivated by both demands. Social demands refer to the communication and needs of a society while market needs refer to economic needs (Marais, 2011).

Although there is evidence of a vast number of ICT4D initiatives and projects in South Africa there is still a concern as to whether there is strategic research, which could assist in the implementation of ICT4D projects in future (Turpin, 2018). While ICT is imperative for human progress, it is however, an instrument utilized to facilitate the development process, therefore, ICT is not always a remedy for developmental problems encountered by previously disadvantaged populations (Mthoko & Khene, 2017; Pouezevara, Mekhael & Darcy, 2014). To add, ICT4D initiatives are predominantly utilized to escalate people's choices because it gives them the freedom to pursue their dreams (Qureshi, 2015). This means ICT4D's adoption is largely reliant on how the beneficiaries respond to the introduction of the ICTs and whether they perceive these to be useful to them or not. Moreover, the beneficiaries must perceive ICTs as a useful and empowering instrument that will assist in their growth.

Another method of ICT4D implementation is through mobile phones. According to Rivett (2017), mobile phones were used to bridge the digital divide. Mobile phones offer the opportunity to collect data faster and easier than previously (Rivett, 2017). According to Rivett (2017), mobile phones have expanded opportunities for people to have access to

information. ICT4D program leaders need to be trained and must be done in the shortest time possible. There is a need to pay careful attention to the ICTs without causing damage to maintenance and support of the adopted ICTs.

According to Njoh (2018), mobile phones affect development in five ways. Firstly, they enable people to access information which reduces costs, for example, assisting farmers to access market information through a mobile app. Secondly, they enhance social interaction amongst people (Njoh, 2018). This allows for increased and better productivity in a business setting as communication is faster and easier. Thirdly, mobile phones affect development through job creation as some people start enterprises selling mobile phone equipment. Moreover, through easier communication, some people own online stores as well as being service providers. Fourthly, mobile phones improve access to emergency services such as hospitals, fire departments, and social welfare services, insurance and so on. Lastly, mobile phones facilitate the delivery of services in sectors such as agriculture, health, education, and finance. Examples include M-Pesa in Kenya, e-school, online banking and other services.

Hatakka, Thapa and Zhang (2018) asserted that the improvement of people's lives through ICT4D could be through enhancing socio-economic issues, introducing rural farmers to new markets, technology for environmental sustainability and combating corruption through the use of ICTs. They further stated that there are challenges in identifying stakeholders in development. The section that follows describes some of the ICT4D projects initiated in South Africa.

2.5.1 ICT4D projects implementation examples

This section discusses the projects and organizations in which ICT4D was implemented. South African examples are used to illustrate how ICT4D is applied.

2.5.1.1 ICT Academy

According to T-systems, (2012) the ICT Academy, was initiated by T-systems in association with Systems, Applications and Products (SAP), Microsoft, and CompTIA. The initiative's primary goals were to reduce poverty and to improve employment through empowering beneficiaries from previously disadvantaged communities with ICT expertise and knowledge (T-systems, 2012).

1824 apprentices have received ICT skills that are acknowledged globally. Moreover, approximately 85% of the apprentices were employed after they received training from the project. The organization grew from enrolling 121 students to enrolling about 1000 students

over 9 years (T-systems, 2012). The students are trained in IT skills using courses such as CISCO CCNA and CCNP and SAP Business One certificates. With these skills the beneficiaries are absorbed into the job market. The project therefore benefited the beneficiaries by equipping them with digital skills in programming and this assisted them in obtaining jobs.

2.5.1.2 Cape Digital Foundation

According to Cape Digital Foundation, (2016), the organization's main objective was to promote socio-economic liberation, improvement and occupation prospects in the Western Cape region. The purpose was to promote socio-economic improvements through the introduction of educational projects that would improve the employability of the previously disadvantaged individuals (Cape Digital Foundation, 2016). Moreover, according to the website, the other objective was for the beneficiaries to obtain the benefits of technology.
The benefits included the introduction of e-learning technology for schools (Van Dyke, 2016), training of SMME shop owners to assist in the success of their businesses.

2.5.1.3 Mankosi Community Network

The Mankosi Community Network is an ICT4D project that was initiated by backpackers in the Xhosa village of Mankosi, Eastern Cape. It is currently managed by the community members (Rey-Moreno, Sabiescu, Siya & Tucker, 2015). The project aim was to introduce wireless networks in the community to reduce communication costs. Since the initiators wanted the locals to have ownership, they used local technicians to install the networks and to conduct research. The initiative was a success as the community continues to use the system (Rey-Moreno *et al.*, 2015). This project indicates that ownership could lead to the success of an ICT4D project/initiative.
The benefits of the project were that firstly the communication costs of the community members were reduced. Secondly, through the project the community members received access to electricity because solar panels were installed. This allowed them to charge their cellphones. Through this project Zenzeleni NPC co-operative was formed.

2.5.1.4 Build Africa Project

This is an initiative implemented by the European Commission to enhance education, healthcare, and research centers through ICT (Ramirez-Robles, Jimenez-Castellanos, Khalifa, Anne, Kamga, Afagbedzi, & Maojo, 2013). The strategy for implementing this project was to use the existing resources, which were integrated through the use of first-rate ICT

infrastructure to strengthen education, research, and alliances (Ramirez-Robles *et al.*, 2013). Moreover, the aim of the project was to build a platform for practitioners, students and researchers to access information online (Ramirez-Robles *et al.*, 2013). Through this project several social networks were created. This includes Doctors hangout and Patients Like Me. The project also aimed to facilitate collaboration of health practioners and the learning portals.

In summary, these projects demonstrate how ICT4D can be implemented. The above projects are also ongoing and the benefits they deliver are incremental.

2.5.2 Challenges in ICT4D projects implementation

Devex Impact Editor (2013), identified five challenges of ICT4D application in international non-governmental organization (INGOs). The first challenge is that the ICT4D projects are not sustainable and have a small scale. Secondly, the lack of skills and knowledge to take advantage of the ICT benefits. The third challenge in implementing ICT4D is that it is difficult to change organization's culture and methods of implementation. Fourthly, there is an issue of funding which limits the organizations in the allocation of human resources in the ICT4D projects. Lastly, the introduction of ICTs resulted in the confusion on the roles of INGOs.

2.5.3 Failure of initiatives

According to Mamba and Isabirye (2015) and Bankole (2017), there are negative reports about the performance of ICT4D projects. However, ICTs do have the potential to bring socio-economic development such as transformation in health, education and employment, if implemented properly. This Section discusses reasons for ICT4D failure of projects, which lead to untapped potential to provide social development.

Sahay and Mukherjee (2017) attributed the failure of any initiatives to the lack of political commitment, poor coordination between donors/ sponsors, fragmented structures and unrealistic expectations of the technologies introduced. The differences between the designs and the actual systems/ technology used, also attribute to ICT4D project failure (Sahay & Mukherjee, 2017). This is usually due to the gap between the programmers and the community in which the technology is being delivered. According to Thomas *et al*. (2017), if an ICT is utilized appropriately it would be useful for previously disadvantaged communities. ICT4D is not about the availability of information or implementation of new technologies but it is about how people utilize the available systems to be self-sustainable (Ojo, 2016b). According to Sahay and Mukherjee (2017), the projects/initiatives fail for one of the following reasons: projects decline during the pilot phase or they are terminated once the financial and

technical support is withdrawn. Moreover, beneficiaries are excluded in the planning and implementation of the ICT4D projects.

Although ICTs are perceived to be the solution to some of the philanthropic issues, but if not correctly implemented to mitigate the problems most ICT4D projects will fail due to some human-centric reasons (Walton, 2013). The human-centric problems include cultural issues, which affect communication and trust, and the communities' assessment of the credibility of the ICT4D initiatives (Walton, 2013). Musiyandaka *et al*. (2013) posited the following as the reasons for the failure of ICT4D projects: infrastructure scarcity, failure to contextualize before ICT adoption, scarcity of resources and pessimistic perspectives. South Africa is not immune to these challenges. There are similar challenges hindering the success of ICT4D projects such as poor infrastructure and lack of resources (Mamba & Isabirye, 2015). This affects rural areas mostly due to a lack of proper infrastructures, such as roads and lack of income opportunities for example jobs and businesses (Mamba & Isabirye, 2015).

Other challenges are the lack of local capacity to develop and maintain solutions (Mushiba, Winschiers-Theophilus, Du Preez, Molokwane & Kölhi, 2015). Keijdener, Overbeek and España, (2018) summarized the reasons for the failure of ICT4D projects as the lack of sustainability, evaluation and scalability. The authors pointed out that the lack of sustainability occurs mostly because quick-fix solutions are sought without a comprehensive solution/system. The lack of evaluation results in projects not being assessed, which leads to the repetition of the same mistakes (Keijdener *et al*., 2018). Projects that are implemented cannot be applied in other contexts or places and, therefore, there is a lack of scalability (Keijdener *et al.,* 2018).

Literature conducted by Joseph (2013) about women's ICT4D initiatives in the KwaZulu Natal (KZN) countryside, revealed that factors affecting the implementation were accessibility to infrastructure, levels of income, age, level of ICT skills, cost of ICT access, and the knowledge and understanding of the use of the available ICT. Developers may need to take these factors into consideration before adopting an ICT4D initiative. Self-sustainability may be affected by these influences, which is why project initiators may need to consider these factors. The other factors that could impede successful projects are legislation and unsuitable ICTs being adopted (Joseph, 2013). Intervention through ICTs does not lead to substantial change unless it has been applied in sustainable developmental processes (Zheng *et al.*, 2017). The developmental processes include research on the social context and to motivate recipients to participate (these will be discussed in Section 2.5). In summary, most ICT4D barriers stem from political, cultural, social and institutional aspects of the society rather than the technology itself.

Baduza and Khene (2017) stated researchers generally agree with each other that most ICT4D initiatives fail, however, there are varying reasons why adoption or implementation fail. Walton and Heeks (2011) suggested that the failure of ICT4D projects is because: beneficiary participation is minimal; project planning is unyielding; project managers do not learn from past mistakes, local institutions are excluded in the adoption of ICT4D projects, and the absence of project leadership. Baduza and Khene (2017) also asserted that the ICT4D projects were not valuable to the targeted communities because the community members' expectations and needs were not met. In that regard, it is important for initiators to communicate the benefits, and ensure that they research the expectations and needs of the community before implementing any project. Mamba and Isabirye (2015) concur with Baduza and Khene (2017) as they reported that ICT4D projects generally fail, nevertheless, there is evidence of a few projects being successful.

A study conducted by Conger (2015) of the Living Labs projects in South Africa, investigated the significance of knowledge management (KM) use for project success. The results of the study were diverse because a few ICT4D projects were initially successful while other projects were unsuccessful. Conger (2015) also found that in the long term, the ICTs were deserted and, therefore, there was a lack of sustainability. The contributing factors to the success of Living Labs' projects were training and skills development (Conger, 2015).

One of the strategies of ICT4D implementation was the use of mobile phones, the Internet and any existing infrastructure (Ntawanga & Felix, 2013). This strategy failed due to the lack of technological competence, suitability and sustainability (Ntawanga & Felix, 2013). From the literature, a question arises as to how the success of the adoption of ICT4D projects can be promoted, and how the project managers can increase the probability of providing sustainable benefits through these initiatives.

2.6 Determinants of ICT4D adoption

This section delineates what motivates the beneficiaries' to adopt the ICT4D initiatives implemented to assist them. Two of the most common themes for ICT4D project adoption are participative involvement of the users, and contextualization of the implementation of the ICT4D project. According to Zewge, Dittrich and Bekele (2015), Participatory Development works best when it is contextualized. Therefore, these two factors work together. This is discussed in the next section.

2.6.1 Participatory Development

Participatory development (PD) is a method that is utilized to plan and implement ICT4D projects (Hoyng, 2016; Singh & Flyverbom, 2016; Thapa & Sæbø, 2016; Thapa & Sb, 2015).

The main concept of PD is that communities develop better when the individuals involved shape and anticipate their own future (Zewge *et al*., 2015).On the other hand, Participatory Development was also defined as the inclusion of the beneficiaries in the process of implementing the initiatives (Lopez, Franquesa, Navarro, Sanchez, Cabré & Alier, 2015; Singh & Flyverbom, 2016). Participatory Development generally unites the users with the designers, and this assists in the application of future technologies (Zewge *et al*., 2015). Therefore, PD encourages collaboration between the users and the designers.

Thapa and Sæbø (2016) asserted that most of the literature points out that the failure of ICT4D projects is mainly because the targeted stakeholders are excluded in the planning and implementation phases. This view was also supported by Zewge *et al.* (2015), who stated that the failure of the project is not always attributed to the failure of the technology, but rather to recognize the social, and economic issues applicable to the environment where the technology is employed. Therefore, initiators need to involve targeted beneficiaries to increase the potential for successful adoption.

The main aim of the ICT4D projects initiative is to empower the beneficiaries. Through PD, the communities are empowered because of their involvement (Breytenbach, De Villiers & Jordaan, 2013; Jha, Pinsonneault & Dub, 2016; Singh & Flyverbom, 2016). Moreover, PD allows for the ICT4D project to make a meaningful, relevant change in the communities where they are deployed (Zewge *et al*., 2015). In this regard, it is important for the designers to share decision-making with the end-users in the design of the information system (IS) (Zewge *et al*., 2015). Thapa and Sæbø (2016) asserted that PD is significant for the success of ICT4D initiatives, as contextual issues of implementation such as socio-cultural values, local knowledge systems, and the rules that are not easy to identify, are considered.

Another important PD concept that could lead to ICT4D project success is stakeholder analysis, which assists in identifying the relevant people in the project (Zewge *et al*., 2015). Maail *et al.* (2017) stated that it is vital to the success of the ICT4D project that there should be equilibration between the participation of the community and the development approaches.

PD can experience challenges. These include the assurance of the involvement of people (Thapa & Sæbø, 2016), the concept of ICT4D being multidisciplinary, and the difficulty to interpret the socio, economic and organizational issues when constructing or selecting a suitable technology (Zewge *et al.,* 2015).

According to Maail (2011), stakeholders' participation increases the probability of success of the initiative. Baelden and Van Audenhove, (2015) and Bon *et al.* (2016), stated that there is a shift in ICT4D from modernization (upgrading of the developing countries by bridging with

the developed countries) to participation (involving the users or stakeholders to find solutions to their plights). The shift can be because technologies designed for the first world countries may not be applicable in the third world countries (Zewge *et al*., 2015). PD technologies are perceived as tools that allow the stakeholders to realize local knowledge and practices (Baelden & Van Audenhove, 2015).

2.6.2 Contextualization

Context, according to Avgerou (2010), is the process and conditions of the place where an ICT will be implemented. To have developmental benefits through ICT, it is important to assess the place in which it will be implemented. According to Hayes and Westrup (2012) and Thomas *et al*. (2017), contextual factors must be understood to escalate their potential for successful adoption of an ICT4D project. On the other hand, failure can be attributed to the non-alignment of the technology to the context (Diniz, Bailey & Sholler, 2014; Okon, 2015). Context focus of ICT4D assists in revealing the needs and the best solutions. This ensures better adoption and implementation resulting in social change in the place where it is introduced (Baelden & Van Audenhove, 2015). The most common ICT4D initiatives are characterised by design processes such as understanding social and technical aspects, and implementation (Lopez, Franquesa, Navarro & Sanchez, 2012; Nuseibeh, Hevner & Collins, 2017). Lopez *et al.* (2012) stated that these processes work in partnership with the numerous patrons. To assess the different phases of an ICT4D initiative, Krauss (2017) revealed that it was challenging to implement if the project leaders did not understand the context of the community's culture and experiences. This makes it difficult to assess the challenges of introducing, implementing and evaluating the ICT4D initiative (Da Silva & Fernández, 2016; Krauss, 2017). Zheng *et al*. (2017) argued that ICTs are not a panacea for structural problems but usually increase inequality. Sahay, Sein and Urquhart (2017) noted that technology is just one of the aspects in an effort to bring transformation. Before implementing and introducing the technology where it is needed, it is important to first study the community or society. If this is not done, then introducing the technology may prove to be futile (Rivett, 2017).

ICT4D is encompassed by soft and hard factors, which are important to be in balance so that the initiatives achieve optimal results (Thapa & Sæbø, 2016). Soft factors include people, culture, politics and organizational issues (Thapa & Sæbø, 2016). The hard factors, on the other hand, include hardware, software and networks (Thapa & Sæbø, 2016). The role of the project managers is to ensure that all these factors are considered to ensure success in implementing ICT4D initiatives. These soft and hard factors will be discussed in the

subsections as follows: firstly, the issues relating to the people and culture, secondly, the political and organizational issues, and lastly, the infrastructural (hard) issues.

2.6.2.1 Social context

Failure of projects may be attributed to differences in the perception of the use of technology between the designers and the users. This is mainly because the designers are remote from the context in which the technology is used (Diniz *et al*., 2017). When the technology is designed remotely, it may lead to failure especially if the users have a strong influence on the implementation of ICT4D projects (Ayoung, Abbott & Kashefi, 2016; Diniz *et al.,* 2017) resulting in the neglect to understand the context in which these are implemented, and poor management (Walton & Heeks, 2011).

Baelden and Van Audenhove (2015) asserted that ICT4D was evident in the rollout of telecentres, which focused on the introduction of technology rather than the users or the stakeholders. This led to the failure of several projects due to the lack of sustainability, scalability and assessment of the goals (Baelden & Van Audenhove, 2015). The focus was to improve accessibility and introduction to the technology, while the lack of sustainability as the context was ignored (Baelden & Van Audenhove, 2015). Technology should focus on the needs of the community and a more practical way to meet these. Therefore, user readiness and cultural experience should also be considered to ensure the success of ICT4D projects. Rivett (2017) stated the importance of understanding that there is no one-size fits all as different contexts of culture and mindsets are different. To manage resources in a nation, one must be able to identify experts in the particular field. According to Rivett (2017), to maintain sustainability, public participation is important. The author also added that community engagement increases transparency.

One of the methods to study contextualization is through human-computer interaction (HCI) which involves users directly and is attentive to the local context of where the technologies are implemented (Diniz *et* al., 2017; Mashinini & Lotriet, 2011). Contextual issues go beyond user-interaction but focus on social, political, cultural and organizational uses of the technology. If these issues are understood, the designers will deliver better technologies, which could lead to the success of the project, while the users may adjust the technology to align it with the context (Diniz *et al*., 2017). The needs of the users in relation to technology are important to deliver an efficient system (Lehong, Van Biljon & De Kock, 2018).

Political issues may also hinder or enhance the adoption of an ICT4D project, as the installation of infrastructure may need to follow certain political protocols (Csíkszentmíhalyi, Mukundane, Rodrigues, Mwesigwa & Kasprzak, 2018). Economic factors such as education,

income and employment also affect the implementation of ICT4D (Oelen, Van Aart & Boer, 2018). The social issues include political and economic issues as well as the interaction with users (Njihia & Merali, 2013).

2.6.2.2 Infrastructural context

Kayisire and Wei (2016) stated that there has been a rapid increase in the infrastructure in the African countries, the largest increase being in the subscription to mobile devices, and the use of the Internet (Ochara & Mawela, 2015). According to Hosman and Armey (2017), infrastructure is key to the acceptance of the technology. Without it, inequality persists. Therefore, it is important to consider the technology infrastructure as part of the determinants for the success of project adoption.

Social and technical knowledge is important for the acceptance of ICT4D projects to ensure a functional system is delivered in a context-specific way (Hosman & Armey, 2017). The infrastructure includes electricity, cost of maintenance, robustness and ease of maintenance. To ensure the success of an ICT4D project, these need to be considered in the planning phase (Qureshi, 2015). Without a plan for the electrical infrastructure, especially for rural areas, ICT projects have failed when there is no electricity (Hosman & Armey, 2017). Gwaka, May and Tucker (2018) and Loudon and Rivett (2011) support the findings as they stated that the presence or absence of infrastructure affects the digital divide. Hosman and Armey (2017) emphasized that the lack of electricity is a huge problem in developing countries as people, even in urban areas, complain about power outages. Some communities utilize different power sources such as solar and gas. These sources, however, may damage the ICT4D devices (Hosman & Armey, 2017). Devices utilized to adopt ICT4D may need to be compatible with the power sources for the users in the communities.

Environmental issues such as temperature, winds and humidity also affect the acceptance of ICT4D as they affect the durability of the technology in use (Hosman & Armey, 2017). This will, therefore, affect the cost of maintenance and the replacement of technological hardware rendering it almost impossible to replace financially (Hosman & Armey, 2017).

Internet connectivity should also be taken into consideration, especially with the initiatives of the development of mobile technology. According to Csíkszentmíhalyi *et al.* (2018), the Internet is widespread in sub-Saharan Africa. However, due to high costs, illiteracy, lack of electrical grids, Internet usage is low, especially in rural areas (Csíkszentmíhalyi *et al.,* 2018). According to Turpin (2018), there are established ICT infrastructures, particularly in large parts of South Africa with a high rate of mobile phone usage. Despite the established

infrastructure, there are socio-economic issues such as an increase in the unemployment rate to 36%; this includes discouraged employment seekers (Turpin, 2018).

2.6.3 Other determinants

Oelen *et al*. (2018) included sustainability as a determinant, they, however, asserted that the pursuit of sustainability contradicts ICT.

Keijdener *et al*. (2018) emphasized that the scalability of an ICT4D project also determines acceptance together with 17 factors that influence the scalability of ICT4D projects. These are shown in Figure 2.3 below:

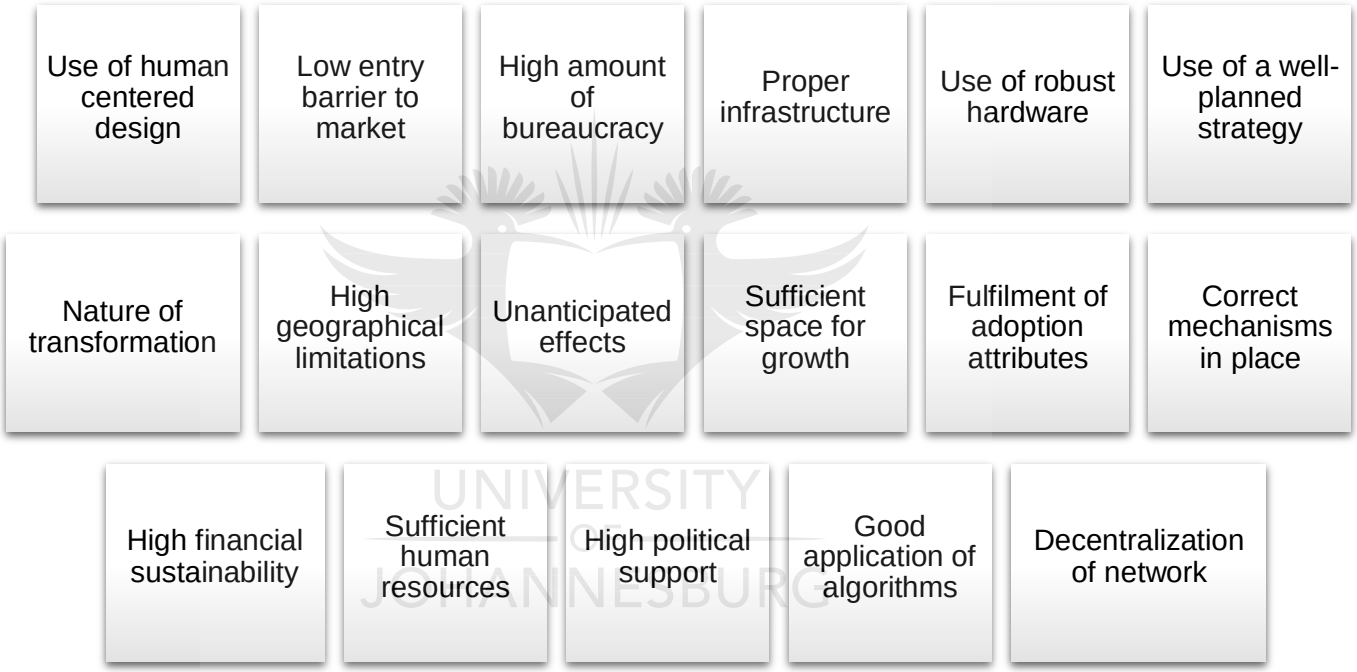


Figure 2.3. Scalability factors of ICT4D projects (Source: Keijdener et al, 2018)

2.7 ICT4D frameworks

The application and success of ICT4D projects are assessed to determine whether they are effective to adopt or not (Mamba & Isabirye, 2015). This Section includes the approaches and frameworks used in numerous initiatives to give guidelines that may assist to obtain the success of the ICT4D projects. Heffernan, Lin and Thomson (2016) stated that the significance of the approaches and frameworks is to assess if the targeted communities benefitted from the initiative or not.

There are numerous approaches and frameworks that are utilized to plan, implement and assess the performance of ICT4D projects. These include the Capability Approach (Sen, 1993), the Cube Framework (Hilbert, 2012), the Technical Acceptance Model (TAM), the Theory of Reasoned Action (Trafimow, 2009), The Theory of planned behavior (TPB) (McDermott, Oliver, Simnadis, Beck, Coltman, Iverson & Sharma, 2015), the Social Cognitive Theory (SCT) (Vinney, 2018), the Unified Theory of Acceptance and Use of Technology, the Choice Framework (Hatakka, Thapa & Sæbø, 2016), Participatory Development (Hoyng, 2016), and the African Information Society Initiative (Ojo, 2016a).

The frameworks and approaches covered in the next Section are the Cube Framework, the Capability Approach (CA), and the Technological Acceptance Model (TAM). The Cube Framework illustrates the external factors while the Capability Approach and the Technological Acceptance Model illustrate the attitude of the beneficiaries and what motivates them to adopt ICT4D. The other frameworks mentioned were presented in Section 2.6.4.

2.7.1 The Cube Framework

According to Hilbert (2012), the Cube Framework was proposed by the United Nations Regional Committee for Latin America. The Framework also has its fundamentals in the Schumpeterian Theory of socio-economic evolution and innovation (Hilbert, 2012). According to the Schumpeterian Theory, it is important to the have technology to enhance socio-economic progress (Sobiecki, 2013). The ICT4D Cube Framework depicts the interrelationship of socio-economics, technology and policy development and is used to identify social needs, evaluate and monitor initiatives, as well as coordinate the human and non-human resources (Hilbert, 2012). The Framework also depicts society's transition to technologically-based economies (Pavel, Fruth & Neacsu, 2015).

The socio-economic institutions affected include businesses, schools, health, government, culture and so on (Hilbert, 2012). Figure 2.4 illustrates the ICT4D Cube. Five service sectors are mentioned in the Framework, however, more services such as agriculture and employment are also affected (Pavel *et al.,* 2015). The underlying technologies include the infrastructure for telecoms, hardware and software used to deliver services on which digitization occurs (Hilbert, 2012). Lastly, the policies that inform both socio-economic and technologies include regulations and incentives.

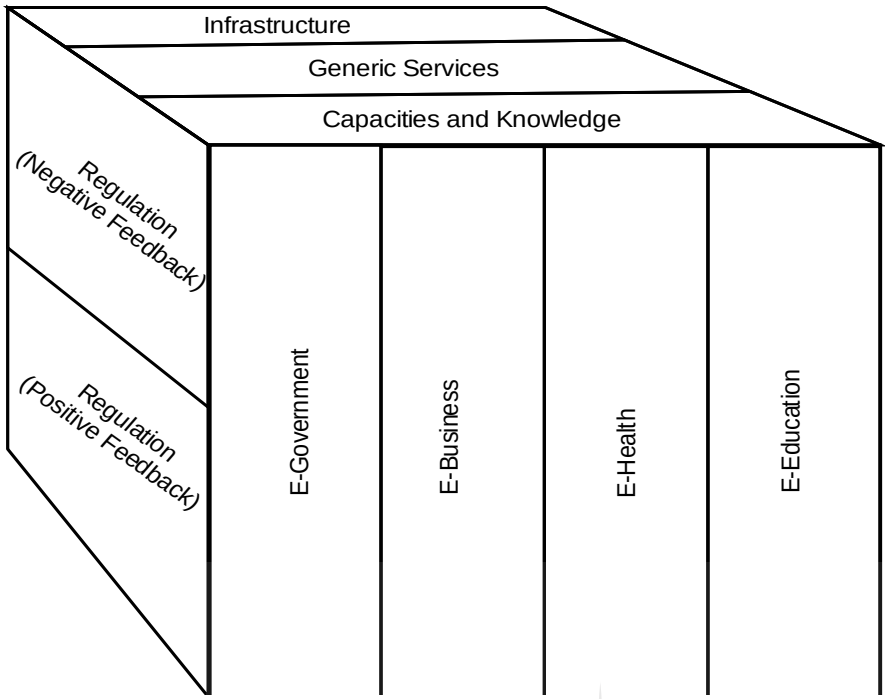


Figure 2.4. The Cube Framework illustrated (Source: Hilbert, 2012)

2.7.2 Capability Approach

According to Rislana, Good, Adams and Scott, (2016), the Capability Approach (CA) was initiated by Sen (1993). The Framework shows that to exercise freedom, individuals must have a 'capability,' which means they should be competent (Rislana *et al*., 2016). Hatakka *et al.,* (2016) added that CA focuses on giving people the freedom to be self-sustainable. Szekely and Mason (2018) affirmed this perspective as they stated that CA focuses on the opportunities that the world gave to individuals in certain settings and how these individuals took advantage of them.

Egessa, Liyala and Ogara, (2018) stated that CA conceptualizes ICT4D as a method of increasing opportunities, and it gives people the freedom to pursue the living standards they need or want. The authors added that the approach is used to evaluate individual well-being and social activities. Moreover, the activities should be enhancing people's abilities to achieve their goals in what they want to do or who they want to be. People's achievements are measured by what an average person is able to do in their capacity (Egessa *et al.,* 2018). Egessa *et al*., (2018) stated that this Framework depicts that there is a difference between methods and results of the security given to the people; where methods they refer

to as a means, are used to facilitate development, security, health and other issues, whereas the results can be outcomes in the achievement of unanticipated goals.

Egessa *et al*. (2018) echoed Sen's (1993) views as they mention that CA is important because it focuses on what people are able to do rather than what they consume. One can, therefore, conclude that the focus is on ensuring people are self-sustainable. Hudson (2018) also advocated for CA as he stated that it focuses on human dignity, which assists in the adoption of emerging technologies. Human dignity is provided by opportunities through the ends and means of a development process, which is aided by economic growth amongst others (Szekely & Mason, 2018). Szekely and Mason (2018) added that the role of development in CA is multiple as the aim will be to ensure people are given opportunities from several angles to ensure they become self-sustainable. Therefore, the CA Framework assists in measuring the capabilities/ freedoms, opportunities and development through ICT4D. This will assist in ensuring adoption is also conducted optimally.

2.7.3 Technological Acceptance Model (TAM)

This Model was developed by Fred Davis in 1989. According to Adiyarta, Napitupulu, Nurdianto, Rahim and Ahmar (2018), TAM is a technological model used to predict human behavior in their adoption of technology. Adiyarta *et al.* (2018) added that TAM is very important in monitoring user acceptance and the use of technology. The main concept of TAM is that the technology is useful and easy to use (Adiyarta *et al.*, 2018).

TAM actually measures the level of the users' adoption of technology (Adiyarta *et al.*, 2018). The importance of TAM is that is assists in understanding humans' acceptance or rejection of technology (Marangunić & Granić, 2015). TAM is based on two concepts: namely perceived usefulness and perceived ease of use. Figure 2.5 illustrates the constructs of TAM.

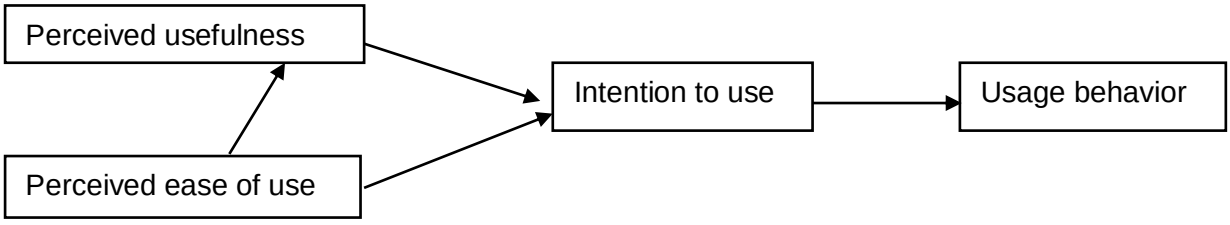


Figure 2.5. Constructs of TAM (Source: Marangunić & Granić, 2015:86)

Perceived Usefulness (PU) refers to the extent to which users observe how technology is beneficial to them, while Perceived Ease of Use (PEU) is the users' view on their ability to easily use the technology (Wingo, Ivankova, & Moss, 2017).

Factors influencing PU include the generic norm, relevance of the technology to the tasks that need to be achieved by using it, the value of the technology used, and noticeable results achieved through the use of the technology (Wingo *et al*., 2017).

TAM is important for the adoption of ICT4D as it would be useful in the assessment of how the targeted beneficiaries perceive the technology. The usefulness of the technology is revealed through the lenses of the beneficiaries, however, for this research, the perceived usefulness is derived from the perceptions of the Digify Africa project managers who were part of the research.

2.7.4 Other frameworks

There are other adoption frameworks, which relate mostly to technological implementation. In Table 2.4 below is the list of the other frameworks presented by Aswani *et al.* (2018):

Table 2.4: Frameworks for ICT adoption (Source Swan et al (2018)

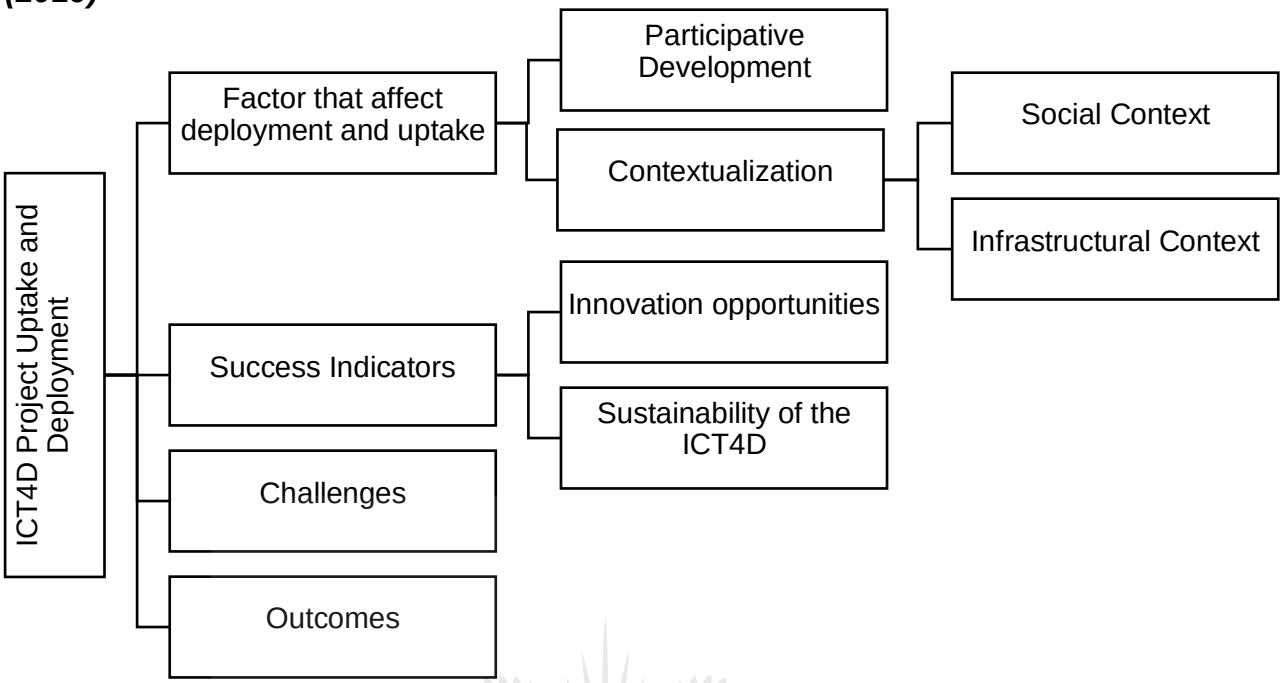
Framework	Description
Theory of Reasoned Action (TRA)	The theory suggests that intention precedes a particular action (Trafimow, 2009). However, it is difficult to know a person's intention, therefore, this theory was not used in this study.
Theory of Planned Behavior (TBP)	Prediction of behavior using intention and perceived behavioral control (McDermott *et al*., 2015). This study is explorative and does not seek to predict user-behavior.
Social Cognitive Theory (SCT)	It is a Theory that asserts that human behavior can be shaped through learning from others, through observation and imitating them (Vinney, 2018). This is not applicable to this study because the projects at Digify Africa provide mainly training.
Unified Theory of Acceptance and Use of Technology (UTAUT)	This Framework is utilized to predict adoption of technology by the users due the following influences: performance expectancy, effort expectancy, social influence, and facilitating conditions. This is not applicable to this research is based on the perception of the project managers instead of the prediction of technology adoption.

Framework	Description
Africa Information Society Initiative (AISI)	The Africa Information Society Initiative (AISI) was implemented as a framework to construct ICT infrastructure in Africa (Ojo, 2016a). The primary objective of the framework was to contribute in the implementation of digital connectivity and ensure ICTs were accessible in rural areas in Africa (Ojo, 2016a). The goals were supposed to be achieved by 2010. However, they were not, as only 10% of people in the rural areas have access to ICTs (Ojo, 2016a). This framework was utilized contract infrastructure, however the research was based on the perception of the projects managers regarding projects that have already been implemented.
Choice Framework	The Choice Framework is built on the capability approach as it asserts that people's competences and freedom are a result of their choices (Hatakka *et al*., 2016). This Framework was not used because it is used to predict beneficiaries' choices to use technology introduced to them while this research is based on the opinions of the project managers (who are the initiators

2.8 Conceptual Framework

This Framework was formulated on the basis of the literature review. This Section delineates the purpose and direction of this study. The factors affecting ICT4D projects uptake and deployment at Digify Africa was assessed using the Conceptual Framework. The frameworks presented in Section 2.7 were not utilized to assess Digify Africa because they were mostly about predicting beneficiaries' response to ICT4D, however this research assesses the initiators' perspectives and experiences in the uptake and deployment of ICT4D. Figure 2.6 below illustrates the Conceptual Framework.

Figure 2.6. Conceptual Framework (Source: Author's own work compilation (2019)



The Conceptual Framework was formulated using the determinants of ICT4D which are presented in Section 2.5. The success factors presented in Section 2.3.3, the outcomes and challenges were found Section 2.4. The Conceptual Framework served as a guideline in the research process. Table 2.5 below illustrates how the conceptual framework was formulated.

Table 2.5: Conceptual Framework's constructs origins

Literature	Subjects	Construct
Manara and Gelderblom (2016)	Sustainability of ICT4D project	Success indicators
De' *et al* (2018)	Changes in developing countries through the deployment and utilization of ICT	Success indicators
Devex Impact Editor (2013)	Challenges of ICT4D implementation	Challenges
Thapa and Sæbø (2016)	Importance of ICT4D in empowering disadvantaged communities	Participative Development
Zewge et al., (2015)	How ICT4D enhances development	Participative Development
Diniz et al., (2017)	Difference in designers'	Social context

Literature	Subjects	Construct
	perception and users' experiences	
Hosman & Armey (2017)	Importance of including hardware in the planning of ICT4D project	Infrastructural context
Njoh (2018)	Use of Mobile phones in enhancing development	Outcomes

2.9 Conclusion

The literature that was consulted provided the definition of the terms that were relevant to the study, which included the development, ICT and ICT4D project success. Furthermore, a brief historical background on ICT4D was revealed to provide a perspective on the evolution of the implementation of ICT4D. The historical background shows the transition from modernization to the human-oriented adoption of ICT4D.

In this Chapter, the adoption of ICT4D projects, together with the methods of adoption were revealed. South African examples were presented to illustrate the adoption of ICT4D in different sectors. What followed was an analysis of the determinants of the adoption of ICT4D, which were summarized under Participative Development and contextualization. These factors were found to work together. The other factors included sustainability and scalability.

The frameworks used to plan, assess and show the success of ICT4D projects were also revealed. These are the Cube Framework, the Capability Approach (CA) and the Technological Acceptance Model (TAM). The other frameworks were also summarized in Table 2.4. Lastly, the conceptual framework was presented.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this chapter is to articulate the research methodologies and the process utilized for this research. The Chapter is therefore structured as follows: Section 3.2 illustrates the research onion. Section 3.3 presents the research philosophy, which is interpretivism. The Section that follows depicts the research approach. The research method is then presented in Section 3.5. The research strategy is then presented, followed by the depiction of the time horizon in Section 3.6 and 3.7 respectively. The techniques of data collection, data analysis and the sampling follow in section 3.8. Lastly, the chapter is summarized in the conclusion section.

3.2 Research onion: Framework for research methodology

One of the core aspects of research is understanding the researcher's perspective and approaches when collecting and analyzing data. The research methodology is defined as the systematic process utilized to find a solution to a research problem (Sahu, 2013). The onion ring (Figure 3.1) by Saunders *et al*. (2016) illustrates the research methodologies, which include the following aspects of the research: the philosophy, the approach, the research method, research strategy, the time horizon of the research, and the research techniques and procedures. Figure 3.1 below illustrates the onion ring.

The research methodology presented how and why the research was conducted. Moreover, it depicts the assumptions made while conducting the research. The layers of the onion ring were utilized for the structure of this Chapter.

The research was based on an ICT4D initiative that was implemented by Digify Africa. The project managers gave the overview of the planning, implementation and the outcome of the research project. Moreover, they provided information on whether the project goals were achieved or not, as well as the impact and benefits (if any) of the initiative.

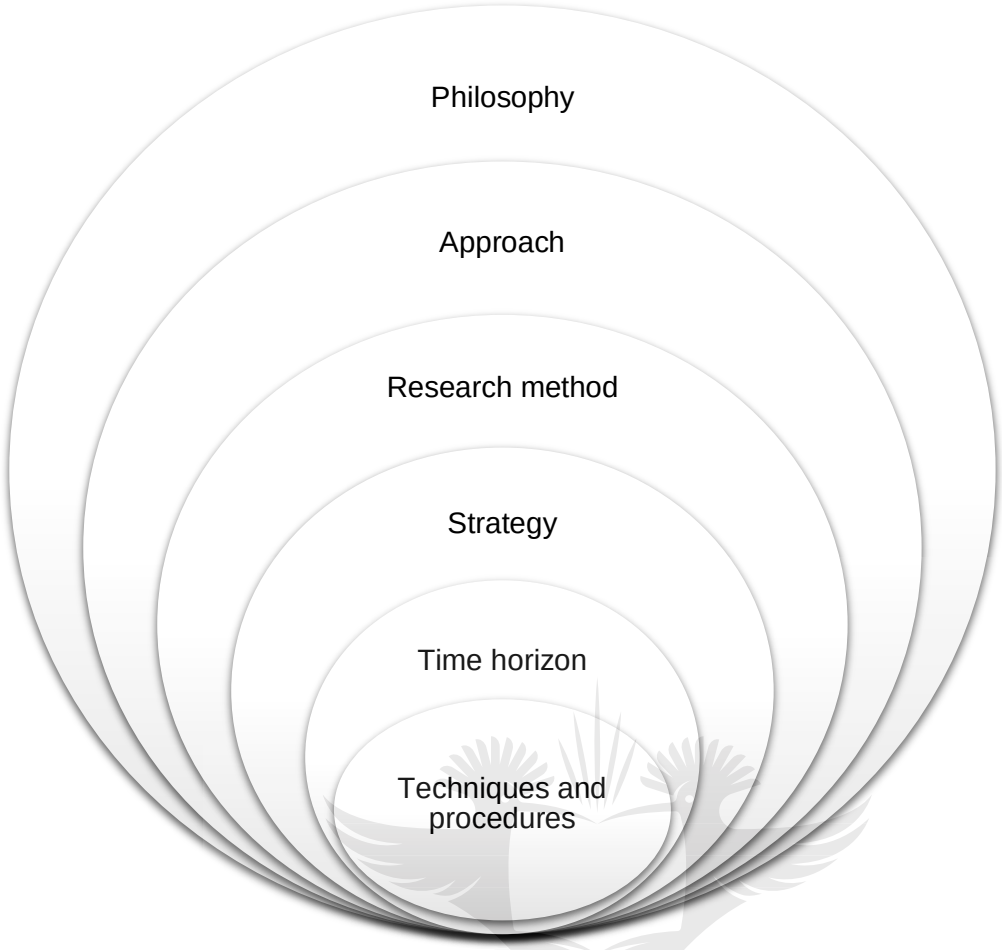


Figure 3.1. Onion ring (Source: Saunders et al., 2016:128)

3.3 Research philosophy

The philosophy of the researcher for this dissertation was interpretivism, which is the view that knowledge and reality are a result of human experiences and practices (Saunders *et al*., 2016; Klenke *et al*., 2015). The experiences and practices presented in this research were subjective, as individuals gave their opinions and experiences. The factors affecting ICT4D projects uptake and deployment were subjective because the project managers had different perceptions regarding the benefits and contributions. The data generated through the interviews revealed that the factors affecting uptake and deployment of ICT4D projects were subjective to individuals.

According to Klenke *et al*. (2015), the ontology of interpretivism is that the researcher and reality are inseparable, while the epistemology is that knowledge is based on the expression of perspectives and the experiences of individuals. Ontology addresses how the researcher perceived the nature of reality (Klenke *et al.*, 2015). Epistemology is how the researcher gained knowledge about a subject (Klenke *et al.*, 2015). The research conducted was based on the description of the experiences of the project managers.

In interpretivism, the social context is important when interpreting data, which was the case of this study. The knowledge of the project managers was obtained through their experiences during the period of the project.

According to Maylor, Blackmon and Huemann (2016), the aim of an interpretive researcher was to understand humans rather than explain their behavior. The main aim of this research was to explore the uptake and deployment of ICT4D projects from the ICT4D project implementers' perspective to provide an outline for ICT4D project implementation and to explore if the initiators' perspectives are aligned to the beneficiaries' perspectives.

Interpretivism assumes that knowledge is gained through human interaction with the society and the world in general (Klenke *et al.*, 2016). The main objective of interpretive research in the Information Systems (IS) field, and for this study, was to understand the context of an information system and how it influenced and was influenced by its context. The other objective of this study was to explore what determined the adoption of ICT4D projects. In the case of Digify Africa, the aim was to explore the uptake and deployment of ICT4D projects from the ICT4D project implementers' perspective to provide an outline for ICT4D project implementation and to explore if the initiators' perspectives are aligned to the beneficiaries' perspectives. The perspective of the researcher was that the factors affecting uptake and deployment of ICT4D projects depended on the experiences of an individual, therefore there is "*no underlying nature of reality*" as stated by Robson (2011).

Interpretivism, which is also referred to as social constructionist research is usually used for qualitative research (Robson, 2011). The philosophy would assist in highlighting the social issues associated with the adoption of ICT4D by the project managers.

Hennink, Hutter and Bailey (2011) identified six perspectives to interpretivism, which included: symbolic interactionism, hermeneutics, dramaturgy and dramatism, ethnomethodology, ethnography and phenomenology. Phenomenology is when the perception and the experiences of individuals are considered to be the subject of the research (Paley, 2016). The project managers in the various initiatives they managed.

3.4 Research approach

The research approach was deductive, which used the data to establish or prove the validity/invalidity of a theory (Remler & Van Ryzin, 2015). The Conceptual Framework which was derived from literature was utilized to assess the ICT4D projects at Digify Africa. In that regard a deductive approach was used.

The other approaches that can be utilized for research are inductive and abduction. However, they are not applicable in this case. The inductive approach is defined as the use

of observations, or data collected to create a theory (Wilson, 2014; Remler & Van Ryzin, 2015). Abduction is when both the deduction and the induction methods are utilized. They are not useful for this study because this research study did not result in the creation of new theories. Figure 3.2 illustrates the inductive and deductive approaches.

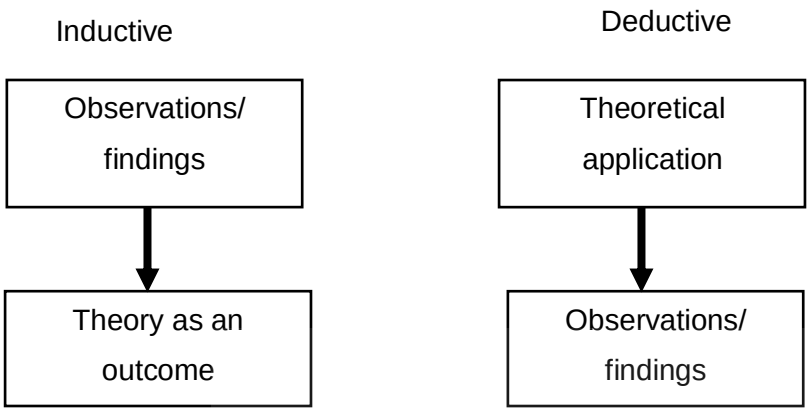


Figure 3.2. How theory fits in research (Source: Wilson 2014:13)

3.5 Research method

The qualitative research method was utilized. Qualitative research is the use of words and /or visuals to collect and present findings (Merriam & Tisdell, 2015 Hair, 2016). According to Saunders *et al*. (2016) and Gephart (2017), qualitative research is associated with the interpretive philosophy. Qualitative research was utilized for this research because the main purpose of the research was to obtain the perspectives of the project managers regarding their deployment and uptake of the ICT4D projects they initiated. The project managers therefore gave an understanding of how to implement ICT4D projects from their own perspectives and experiences. Moreover, the research study was explorative therefore the qualitative research method was relevant. The methods that are usually utilized to collect qualitative data are in-depth interviews and focus groups (Hair, 2016; Du Plooy-Cilliers, Davis & Bezuidenhout, 2014). The data collection methods were discussed in Section 3.8. The only data collection method that was utilized was in-depth interviews, therefore, this was mono qualitative research. According to Saunders *et al*. (2016), mono methods are when a single method is used to collect data.

Qualitative research was relevant for this study because the experiences of the project managers were based on their personal perspectives. Furthermore, the information collected was not predictable. Qualitative data can only be presented using words and not numbers (Walliman, 2017). The nature of the data collected, which was the opinions, perceptions, and experiences of Digify Africa's project managers, cannot be measured but only revealed through the utilization of words.

3.6 Research strategy

The research strategies utilized were the case study. A case study involves the study of a social phenomenon in a real context (Du Plooy-Cilliers, *et al*., 2014). Additionally, a case study is in-depth and provides a comprehensive understanding of the application of a concept from the perception of the participant (Du Plooy-Cilliers *et al*., 2014). The tools utilized for a case study are in-depth interviews, archival records, documents, physical artefacts and observation (Du Plooy-Cilliers *et al*., 2014; Yin, 2012). In-depth interviews were conducted with the project managers to understand their perceptions regarding the implemented projects.

Research can be conducted using single, embedded or multiple case studies (Yin, 2012). An embedded case study is the use of multiple units of analysis within a single organization (Farquhar, 2012; Yin, 2012), and was selected for this research. The units of analysis within Digify Africa were the projects that were implemented. This study was based on four projects within Digify Africa.

The research was conducted to explore the factors affecting the uptake and deployment of ICT4D initiatives in the context of Digify Africa's projects. The case study was relevant as it was viewed as a method that was utilized to gain an understanding and to apply ICT4D.

According to Yin (2012) a case study can be applied for the following reasons

i. When the "how" and "why" questions are asked
ii. The researcher has little control over events
iii. To make an evaluation

The case study was selected to obtain the perceptive of project implementers in the uptake and deployment of ICT4D projects. Moreover, the factors affecting ICT4D uptake and deployment were explored. The researcher did not have control over what the respondents may have viewed as contributors to the adoption of ICT4D projects.

3.7 Time horizon

Saunders *et al*. (2016) identified two (2) time horizons: cross-sectional and longitudinal. The time horizon for this research was cross-sectional, which was a 'snapshot' of where a particular phenomenon occurred at a particular period in time (Saunders *et al*., 2016). The research was conducted once and not tested over a long period, which is applicable to the longitudinal time horizon (Saunders *et al*., 2016).

3.8 Techniques and procedures

The research process is summarized in Figure 3.1 below:

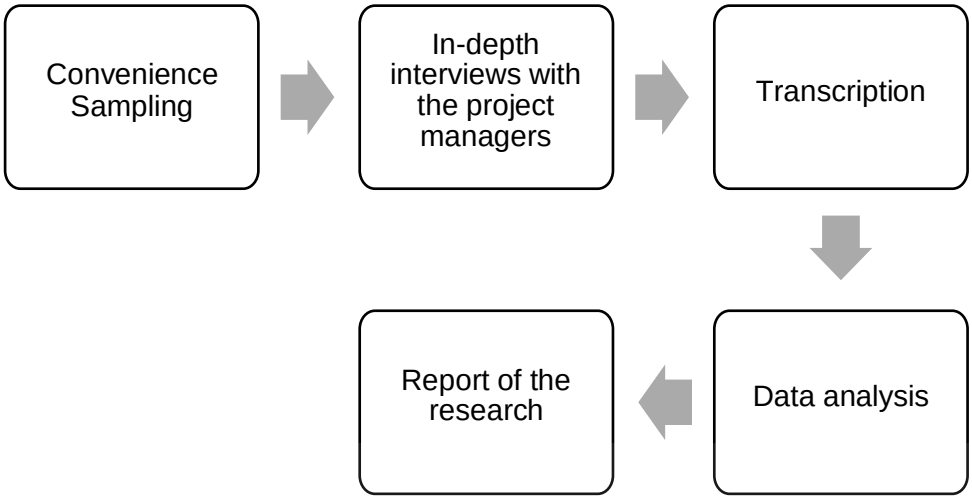


Figure 3.3: Research process (Source: Author's own compilation 2019)

3.8.1 Sampling

A sample is a group of units selected to represent a population in a research study (Du Plooy-Cilliers *et al*., 2014). There are several sampling methods, which include: random sampling, systematic sampling, stratified sampling, cluster sampling, accidental sampling, convenience sampling, purposive sampling, quota sampling, snowball sampling and volunteer sampling (Du Plooy-Cilliers *et al*., 2014; Saunders *et al*., 2016). These sampling methods are summarized and described in Table 3.1:

Table 3.1: Sampling Methods (Source: Du Plooy-Cilliers et al., 2014)

Sampling method	Description
Probability sampling	
Random sampling	This is when all units in the targeted population have an equal chance of being selected.
Systematic sampling	Systematic sampling is when a population is chosen using a random initial point with the same intervals.
Stratified sampling	When the population is grouped according to categories and each category has equal numbers represented in the sample. These are small groups called 'stratas'
Cluster sampling	When the population is divided into groups

Sampling method	Description
	and a sample is selected from the clusters. The clusters usually have the same characteristics. The cluster sizes can be equal or unequal.
Non-Probability Sampling	
Convenience sampling	When a sample is selected because of their availability and proximity to the researcher
Purposive sampling	Selection of the population is based on the features of the population and the goal of the research study
Quota sampling	Sample is selected proportionately according to recognized criteria such as gender, ethnicity or age group.
Snowball sampling	This sampling method is used when the researcher has a connection with a small group of people relevant to the research and gains information about more people from the contacts, he/she has.

This study used convenience sampling: the respondents were selected because the researcher received their information from a third party who was either a friend or an acquaintance. This is how Saunders *et al*. (2016) defined convenience sampling. The sample selected was from an existing database of the project, which was provided by one of the project managers. The number of the targeted participants was five (5), however, only four (4) interviews were conducted as one of the project managers was unavailable for the interviews. The sample was selected because of the time limitations and the scope of the study which is a minor dissertation. However, this did not distort the findings because the research questions were answered. In qualitative research, the sample size is not specific. The one rule of thumb with sample size is that the research is completed when the point of saturation has been reached (Richards, 2015). Saturation was reached for this stud some answers were similar because

3.8.2 Unit of Analysis

The unit of analysis for this research was the Digify Africa projects.

3.8.3 Data Collection

Data were collected using in-depth interviews with the project managers of Digify Africa. The interview guide (Appendix E) was used to collect data. In-depth interviews are utilized in qualitative research design and if the research project had an interpretivism research philosophy (Robson, 2011). This was subjective research because the data were interpreted according to what was understood from the words expressed by the respondents. This study used interviews because these provided the respondents an opportunity to share information from their perspectives and experiences. This means the information was biased according to the experiences of the project managers. One of the ways to minimize bias is cross check the interviewees' responses through member checking, however this was not done for this research due to time constraints.

The first step of the data collection was the formulation of the interview questions using the literature review and/ or the research objectives. This is illustrated in Table 3.2 below:

Table 3.2: Formulation of interview questions

Interview question	Literature	Research question
Please describe the ICT4D project/initiative?	-	What are the outcomes of the ICT4D project for the recipients?
What are your duties in this project/initiative?	-	-
Do you involve any of the beneficiaries in the planning of the training project?	Thapa and Saebo (2016)	What are factors that should be considered when evaluating the success of an ICT4D project?
What were the goals of the project?	-	What are factors that should be considered when evaluating the success of an ICT4D project?
Who was the target for the training?		What are the beneficiaries' socio-economic gaps that still need to be filled?
What would you say is the context where the project was initiated?	Thapa & Sæbø, 2016	What are factors that should be considered when evaluating the success of an ICT4D project?

Interview question	Literature	Research question
What measures did you use to assess the success of the project?		What are factors that should be considered when evaluating the success of an ICT4D project?
Do you use any framework in the implementation, planning and control of the ICT4D project?	Capability Approach (Sen, 1993) Cube Framework (Hilbert, 2012) Technical Acceptance Model (TAM) Theory of Reasoned Action (Trafimow, 2009) Theory of planned behavior (TPB) (McDermott, Oliver, Simnadis, Beck, Coltman, Iverson & Sharma, 2015) Social Cognitive Theory (SCT) (Vinney, 2018) Unified Theory of Acceptance and Use of Technology Choice Framework (Hatakka, Thapa & Sæbø, 2016), African Information Society Initiative (Ojo, 2016a).	-
What improvements would you make on the training project?		What are the beneficiaries' socio-economic gaps that still need to be filled?
What were the lessons learnt from the project?		What were the challenges and lessons learnt in implementing the project?

The second step in the data collection was the selection of the population where Digify Africa was selected as a case study due to the relevance and proximity of the organization.

The third step was approaching the relevant people in management to ask for permission to conduct in the organization. Where permission was granted.

The fourth step was the conduction of the interviews where the interviewees were informed participation was voluntary and they had the option of not participating. The interviews were recorded and the participants were informed about the voice recordings. The interview were semi-structured and questions were open ended. All the interviews were conducted in English.

There was one face to face interview which was conducted at the Digify Africa office premises. The other data collection was through three telephonic interviews. This was due to time constraints and the availability of the project managers at the premises. The project managers also opted for telephonic interviews rather than face to face interviews. The limitation of the telephonic interviews is that the researcher missed the body language of the project managers when conducting interviews.

3.8.4 Data Analysis

The data collected from the in-depth interviews were extensive. The data needed to be analyzed to provide a clear reflection. Yin (2016) identified five phases of qualitative data analysis. These are compiling, disassembling, reassembling, interpreting data, and drawing conclusions. This research was conducted using these stages. Firstly, the data was compiled through the transcription of the interviews. Compiling according to Yin (2016) is the sorting of data in an orderly manner.

The second stage is disassembling, which is the breaking of the compiled data into smaller fragments (Yin, 2016). The information was disassembled by breaking down the information obtained from the interviews to identify recurring themes. At this stage, coding was used to identify relevant data for the research. The deductive coding method was utilized where the information discussed in Chapter 2 (Literature review) was used to group the respondents' answers collected from the in-depth interviews.

The following stage is the re-assembling of data. According to Yin (2016) reassembling is the use of illustrations such as graphs, pictures, and tables to present data in an orderly manner. The codes are put into categories then into themes. Thematic content analysis is when relevant data is compacted into themes (Grbich, 2012). The themes can either be decided by the researcher or derived from the literature review (Grbich, 2012). In this study, thematic content analysis was used to derive the themes from the literature review.

Interpreting data is when the findings are critically analyzed (Yin, 2016). The interpretation of the data presented in Chapter 4 discussed the findings as well as the researcher's

interpretation in the discussion section. According to Yin (2016), the conclusion highlights the importance of the research and also shows the lessons learnt and the call to action. Chapter 5 presents the conclusions for the dissertation and it highlights some aspects, which were discovered while conducting and analyzing the data obtained during the interviews.

3.8.5 Ethics

The ethical issues considered for this research were guided by the University of Johannesburg's ethics guidelines, which are as follows:

A letter of consent was sent to the management of Digify Africa. A positive response was obtained from the Director. Ethics clearance was approved by the Ethics Committee of the University of Johannesburg, allowing data collection to be conducted.
The participants' identities were kept confidential. They were informed in writing and verbally that participation was voluntary, and they could withdraw or refuse to continue at any time. Verbal and written consent was provided by the respondents who were willing to participate. The researcher did not intend to cause any harm to the participants. The researcher avoided falsifying information and distorting results.

The projects initiated by Digify Africa were implemented in conjunction with sponsors, therefore, pseudo names were used for the projects. The information obtained from the interviews was stored safely in the computer files. To ensure security the data was encrypted. The recordings and the transcriptions are digital so they could only be stored in digital form.

3.8.6 Limitations

The following were the limitations of this research:

- The research was qualitative and the views expressed may have been biased.
- The researcher may have been prejudiced, which may have resulted in asking leading questions.
- Since convenience sampling was used, the individuals interviewed may have been from the same background with similar views, therefore, causing the information to be biased.
- The beneficiaries of the projects were not interviewed and they may have given a different perspective regarding their experiences of their participation in the projects. One of the project managers was a beneficiary, which provided limited data which was not conclusive in providing the beneficiaries' experiences.
- The interviewees' responses were not cross-checked due to time constraints.

- Member checking was not conducted for this research due to time constraints.

3.8.7 Validity and Reliability

According to Creswell, (2014) various methods are utilized to ensure data validity and reliability. Validity is utilized to substantiate data findings, while reliability is the extent to which the research method utilized results in established and dependable findings (Creswell, 2014).

Multiple methods were utilized to check the validity of the findings. Creswell (2014) identified eight methods nevertheless, for this research, three approaches were utilized. These are present below:

Triangulation: it is the use of different sources to validate data (Creswell, 2014). Project managers were interviewed to obtain different perspectives. The research only used two sources which is the project managers' perspectives and the literature review. The beneficiaries were not interviewed for ethical reasons. Only one of the project managers was a beneficiary and therefore did not provide a full picture of all the beneficiaries' experiences

Peer debrief: This is when a peer is used to review the dissertation to ensure it will be understood by the readers (Creswell, 2014). Fellow MCom students, acquaintances, and colleagues assisted in providing input to the research document. Moreover, the supervisor ensured that the information was presented accurately.

Member checking: this involves showing the interviewees transcripts and/ or the themes that emerged from the interviews to ensure validity (Creswell, 2014). Member checking was not applied for this research due to time constraints.

To ensure reliability, steps suggested by Creswell (2014) were implemented. The steps are as follows:

1. Transcripts were checked to avoid any errors
2. The researcher cross-checked codes utilized by other researchers
3. The researcher wrote and compared codes to ensure consistency of the code definitions.

3.9 Conclusion

This chapter presented the research methodology utilized for the minor-dissertation. Section 3.2 illustrated the research onion which was formulated by Saunders *et al*. (2016). Section 3.3 discussed the philosophy for this research study which was interpretivism. Section 3.4 presented the research approach. The research approach for this study was the deductive

approach where the Conceptual Framework derived from literature in Section 2.8 were used to explore the implementation of Digify Africa's projects.

The research method for this is presented in Section 3.5, the research method is qualitative research. Section 3.6 depicted the case study and the narrative inquiry as the research strategies utilized for this research. Section 3.7 described the time horizon as cross-sectional.

Ethics, validity and reliability were also presented in this Chapter as part of the techniques and procedures. Ethics were applied by adhering to the University of Johannesburg's guidelines. Reliability and validity were applied through triangulation, peer debriefing, and member checking. Reliability was checked through rechecking and ensuring transcripts were evaluated accurately.

CHAPTER FOUR: FINDINGS AND ANALYSIS

4.1 INTRODUCTION

The purpose of this Chapter is to present the findings and the analysis of the data collected through the in-depth interviews. The research had a target of five respondents but one of the project managers declined to participate in the research. The analysis and discussion of the findings are based on the themes identified in the literature compared to the findings during this exploratory research.

4.2 ANALYSIS

The main aim of this Section is to present the method and the steps of the analysis of the findings of the research. The sample population were summarized and the themes are presented.

The units of observation were the project managers who were responsible for the implementation of the projects. Four (4) project managers were interviewed. The interviews were conducted telephonically except for one, which was conducted at the Digify Africa offices. The interviews were conducted and recorded with the verbal and written permission obtained from the interviewees as well as Digify Africa's Managing Director. All the projects were based on the digital training provided to different groups of people either in peri-urban areas or suburbia. The main aim of the projects was to bridge the digital divide by training the youth to be employable.

In this Section, each project is described according to the responses from the in-depth interviews and according to its profile. Pseudo names were provided for the projects, the clients or any other organization mentioned by name to maintain confidentiality.

4.2.1 Method of analysis

The data analysis used was thematic analysis, which is the identification of patterns and themes in a data set (Maguire & Delahunt, 2017). They further stated that thematic analysis is not about giving a summary of the data collected, rather, it interprets the data. This Section delineates the interpretation of the data collected using the thematic patterns identified in the literature review in Chapter 2.

4.2.2 Thematic Analysis

Thematic analysis is defined as the method of identifying relevant themes or patterns in qualitative data (Bryan, 2014). This assist in ensuring that the data collected is more articulate and precise. This method was utilized to code data according to the super themes

which were identified in the literature. Some themes which were not derived from the literature were also identified as depicted in Section 4.3.5.

4.2.3 Analysis steps

In this study, the interviews conducted with Digify Africa's project managers were analyzed using the following steps as outlined by Yin (2016).

1. **Selection of relevant connotations (disassembling):** The significant statements study and were pertinent to the findings
2. **Definition of themes (reassembling):** The study used the deductive approach to define the themes. Categories were predefined drawing on the information collected from the literature review. According to Richards (2015), themes can be imposed or derived from the literature reviewed. Both methods were utilized because other themes relevant to the study were also identified.
3. **Data interpretation:** The connotations were allocated to the relevant themes.
4. **Making conclusions:** The connotations were also described to produce logical information.

4.2.4 Population Description

This section provides a brief summary of the units of analysis: the projects. This gives an insight into the projects. The projects are summarized as follows:

Project A (Respondent 1): The purpose of this project was to provide opportunities to predominantly black youth. The targeted youth were trained in social media marketing. They used these digital skills to gain employment in the marketing agency industry. The project equipped the beneficiaries with social media skills, moreover, the beneficiaries were granted internships at the end of the project. The training of the beneficiaries on how to use social media for marketing. This involves the use of features such as Google analytics or Facebook ads.

Project B (Respondent 2): Project B was initiated to address two issues; firstly, an agency required people to respond to social media queries for a particular financial institution, which was a client to this agency. The second issue was to initiate transformation through employment creation. Digify Africa's role was to recruit and train the beneficiaries. Moreover the project manager also oversees the performances of the beneficiaries.

Project C (Respondent 3): The project was implemented in peri-urban areas in Gauteng, KwaZulu Natal, the Eastern Cape, and Western Cape. The aim was to have trained at least 160-240 people per province at the end of the three (3) years. This was a three-year project with four partners including Digify Africa, Partner 1, Partner 2 and Partner 3. The role of each

of the partners was as follows: Digify Africa conducted the digital training; Partner 1 managed the program; Partner 3 conducted the training on social enterprises and Partner 2 trained the creative aspect. The digital skills that were imparted through this project was showing the beneficiaries how to use social media such as Facebook, Google, and Twitter.

Project D (Respondent 4): The main aim of Project D was to empower entrepreneurs with digital skills by providing them with digital training. The entrepreneurs learned about digital tools that can be utilized for business. Entrepreneurs also learnt business etiquette, such as how to pitch business plans and conduct presentations. Digify Africa recruited entrepreneurs, who were trained on social media platforms and those used by the departments they were allocated to. The entrepreneurs were taught how to advertise their companies using social media platforms. This assisted the entrepreneurs in expanding their businesses.

Table 4.1 below illustrates information about the projects in a short summary:

Table 4.1: Projects' summary

	Project A	Project B	Project C	Project D
Target	Predominantly black unemployed youth	Unemployed youth	Entrepreneurs	Entrepreneurs
Success	Yes	Yes	Yes (at the end)	Yes
Context	Urban	Urban	Peri-urban	Urban
Number of beneficiaries	20 per cohort	10 employed and more to be employed	20 per cohort	20 per cohort
Frameworks	No	No	No	No

4.3 THEMES IDENTIFIED

In this Section, the results of the research are presented based on the themes that were identified in the literature review, therefore the themes were derived through the topics identified in Chapter 2. The themes were as follows:

- The uptake and deployment of ICT4D projects
- Factors affecting uptake and deployment o of ICT4D projects
- Frameworks utilized for assessment

Other themes which were not in the literature were identified as follows:

- Collaboration
- Funding affect the deployment of ICT4D

These themes were imposed because of the findings from the project managers' responses.

4.3.1 The uptake and deployment of ICT4D projects

The ICT4D projects that were implemented provided digital skills training for the beneficiaries. The target groups were youth according to the South African criteria of 18-35 years of age. Moreover, the targeted youth had to be either unemployed or entrepreneurs.

The aims of the projects related to development

The aims of the project related to human development were either to provide employment opportunities or to enhance entrepreneurship. The respondents' responses were recorded verbatim as shown below. Respondent 4 stated the following:

> "*Our goal for this project is equipping entrepreneurs, business on digital.*"

While Respondent 3 stated the following:

> "*Our goal is we want to go out to train young people on how they can use digital marketing as a tool to optimize and grow their business.*"

Respondent 1 stated the following:

> "*Basically, with Project A the aim of the project is to give opportunity poor young people predominantly black beneficiaries an opportunity to gain and leverage off of digital skills in order for them to start a career within the digital industry.*"

The goal of the above-mentioned projects was to ensure that the entrepreneurs grew their businesses. In some instances, the projects addressed the issue of unemployment by showing individuals how to use digital skills to start a small business.

Through these projects, Digify Africa did not just offer training but they also created employment opportunities for the beneficiaries. For example, Project A connected individuals to employment agencies. Respondent 1 stated that the project provided opportunities, especially as the training gave them real experiences of how they could apply the skills gained in the workplace.

Another aim of the projects was to bridge the digital divide. Project C was a good example because it targeted the youth in peri-urban areas on how to use digital skills. Moreover, the

project resulted in the youth giving back to their communities, which assisted in ensuring even those people in the peri-urban areas received digital skills.

Respondent 2 and 3 believed that it was important for individuals to have digital skills. Respondent 2 pointed out that with the fourth industrial revolution some jobs may become redundant While Respondent 4 pointed out that for entrepreneurs, digital skills were important to increase their market base. Respondent 4 stated the following:

> *"We all have an understanding that the world is moving in the digital direction and we need to so FB is also supporting those businesses on those platforms... at the end of the day we have a goal to ensure that our entrepreneurs are equipped with the right tools…"*

Knowledge of ICT4D

The respondents of the interviews were not aware of the term ICT4D. This meant they did not classify their initiatives as an ICT4D project but rather as a marketing training company. This affected their adoption of the project because they did not apply some of the principles of ICT4D.

Although ICT4D was not known by the respondents, they did recognize that the projects they initiated were to address socio-economic issues:

Respondent 1 indicated the following:

> "The *task was to get people who didn't have the opportunity and give them a job. And also, the program just doesn't focus on digital skills only we also focus on the individual holistically. So, we go into presentation skills and we focus on a lot of soft skills in addition to digital skills mainly if the output was that you have an agency job you are a better person after the program. we have people that get into the program and don't even talk like they can't communicate they can't speak but at the end of the program they are able to communicate and speak because part of the deliverables is that you need to pitch you need do presentations and we give them the skills*…"

Respondent 2 mentioned the following:

> *"The targeted group are young people who are unemployed and have a minimal digital experience. 18-35. Team is 23-29"*

Respondent 3 stated:

> *"So, we are targeting only 15-25 year olds and mainly we are looking for women, which is young girls and each participant should do at least 1. Own a business or 2. Be interested in starting a business because the aim of Project C is to create employability and to make sure that they gain the skills for them to go back to their*

communities and make a difference which will improve their livelihoods where they make money out of whatever they are doing."

Project 4 however, did not target a particular group of people.

4.3.2 Participatory Development (PD)

In Chapter 2 it was revealed that the success of ICT4D projects was enhanced through involving beneficiaries in the planning phase. None of the projects involved the participants before the training was conducted. They cited different reasons. Respondent 1 stated:

> "*Our work is mostly demand driven not sponsor based so if the demand is for people to learn user experience design then our program is built for the demand coz we need to know that we giving people skills for them to get jobs…. So, our people that we would consult are the employers rather than the beneficiaries themselves then we give the beneficiaries the skills they need so that they actually get the jobs*."

The involvement of the beneficiaries (PD) was not applicable to this particular project because the context was to equip individuals with skills for the workplace. Therefore, it was more important to consult employing companies rather than the beneficiaries. Moreover, beneficiaries did not control the projects because the training was once-off for them and they were from various communities, including suburbs and townships.

The training material for the project was compiled using what the job market demanded rather than what the participants wanted or the resources they had. However, the selection process did consider the individual's interests in the training topics. Respondent 1 was one of the participants and she had experience of being a previous beneficiary of such a project. This is indicated by her statement:

> "*So, a lot of our beneficiaries will be people who are interested in social media. They've got the skill but they don't have access to the network, so for instance, with me, I was applying for job at a particular agency before Digify Africa and my application was declined. Post Digify Africa they were coming to me because they were certain skills level that I needed but also I was now meeting their requirements versus me applying for a job haphazardly."*

Respondent 4 pointed out:

> "…*to be clear on that is the client would basically say what they want us to train the entrepreneurs on based on the view of what would benefit the entrepreneurs*…"

The clients, in this case, were the company that sponsored the training. This could have been any one of the social media companies that believed certain tools from their platform would benefit the entrepreneurs. The entrepreneurs may be consulted because they may highlight some tools that they felt were needed for their businesses to succeed, and it could be easier to construct a curriculum that would be relevant to their businesses. The exclusion of the entrepreneurs presented problems. The main issue was that as the project progressed the number of attendees decreased over time. Respondent 4 cited problems as follows:

> "*Because of time, their businesses need more of them actually working on the businesses and engaging in other business activities. Its affordability we find that especially for businesses that are struggling to come to the program"*

At the start and the implementation of Project B, there was no participation from the beneficiaries because the training was conducted by the agency. The beneficiaries only started being involved after the uptake of the project. In that regard Respondent 3 stated the following:

> "*So, I hired two team leaders since we started, we decided to sort of promote two people in the team and we have 1 guy and 1 girl who are team leaders and basically they do a lot of the output I just oversee all of it*"

However, the beneficiaries' involvement is important for Project C, which was adopted in peri-urban areas. The project manager pointed out that they conducted a case study before the training. However, there was no involvement of the beneficiaries in the planning and control stages of the project. This resulted in little interest in the project. Respondent 3 pointed out that there were few people who attended the training. She stated the following:

> "…*we are struggling with is marketing the project. So, we are not reaching the target audience. Yes, we know where they are but it might be our messaging that is not clear*…"

The communities that they targeted may have required the involvement of the community's participation as this would enhance the effectiveness of what they aimed to do in the community.

4.3.3 Contextualization of the projects

Projects A, B, and D did have defined contexts as they targeted individuals from different communities. The context for these projects by default was mainly Johannesburg in Gauteng because the training was conducted there. Johannesburg has vast communities; however, some contextual factors were identified during the research. The project managers are of the opinion that the beneficiaries may have been unable to attend the training due to lack of funding.

Respondent 1 posited:

> "*We would take into the townships instead because we've seen that the cost for people to get to our program makes no sense so it would make more sense for us to send someone there and have an immersive experience in the environment you are in versus getting people travelling out of their environment."*

The other contextual issue that was revealed by Project D was that the entrepreneurs failed to attend all the training sessions as they had to manage their businesses, of which many were sole enterprises with only one person to run the business. Respondent 4 stated the following:

> *"I think we working with people that are operating businesses that need them to still manage it, that need them to and especially if these are one man shows. So, it's an entrepreneur that's running the business by themselves. You are very lucky if you have a stream of people that you are working with that knowledge that you are getting the information with them but 80% of the people that are in the program are one-man shows"*

Most of the entrepreneurs ran small businesses, it was, therefore, important for Respondent 4 to conduct research on how to equip these entrepreneurs without interrupting their day-to-day businesses. One of the suggestions was to run online classes, this could be a challenge for entrepreneurs without resources such as Internet access and computer devices.

The training for Project C was held in peri-urban areas located in Gauteng, the Eastern Cape, KZN and the Western Cape. Contextual issues mattered in this instance, as there were several issues that were unique to peri-urban areas.

Firstly, there was the issue of the historical background. The beneficiaries were from previously disadvantaged backgrounds where there was a lack of infrastructure, which affected acceptability and implementation of the digital skills obtained. Due to this uniqueness of the project, Respondent 3 asserted that research was conducted before the training

"*During the induction, there is a baseline survey that each participant has to complete … at the end of the program that means after they have graduated, we then have an end line survey. Where we then find out what did they learnt from the program and what do they plan on doing after the program*."

The baseline survey included research on the income levels and educational backgrounds of the beneficiaries.

The other contextual issue that was identified was that of resources. Since the beneficiaries were trained on different skills to each other, they had to individually identify resources available to themselves. Respondent 3 posited the following:

"*Also, the first day what we do is you will notice that we do community marketing so all the participants will either be working in groups or individually then now they need to think of first thing those things that are available in the community that they can use to benefit. So, for example, if they are using digital that means there might be a library where they can actually go to use the Internet*"

The project equipped the beneficiaries to enable them to give back to their communities.

4.3.4 ICT4D frameworks

There were no defined frameworks from all the projects.

4.3.5 Other themes

Partner collaboration in ICT4D projects

Digify Africa's ICT4D projects were deployment in collaboration with other organizations. Project A was initiated in collaboration with a sponsor and marketing agencies. Project B was conducted with a marketing agency and an employer. Respondent 2 mentioned that this presented challenges as there was a need for Digify Africa to communicate with the agency for the partnership to work. Therefore, collaboration was important as stated by Respondent 3:

"I think it's more on how we do the work and how we communicate as 3 partners in this project coz it's us, the agency and the bank and if there are three partners there could be miscommunication. There will be a whole lot of things that go on so I think the improvements are more towards that."

Project C was conducted in collaboration with three (3) other organizations: Partner 1, Partner 2 and Partner 3. In this project, the partners were co-dependent so there was a need for additional communication. According to Respondent 3:

> *"We manage the project by making sure all the four partners' representative that work on the project have biweekly meetings where we meet telephonically for 2 hours Fridays 09:00-11:00."*

This co-dependence also required accountability, Respondent 3 stated:

> *"So, because its four partners you always have to be accountable by being accountable, I mean I cannot decide to not to do a certain task because by me not doing the task it will affect all the other departments"*

Project D was conducted in collaboration with social media companies. There was a need for collaboration in designing the curriculum. Moreover, there were facilitators from other organizations. In this regard Respondent 4 stated:

> *"And most importantly my role is to go out there and out-source partners that we can work with to make sure that the training does take place"*

Project A was highly reliant on donations or sponsorships. The project would not be adopted unless there was sponsorship. Respondent 1 mentioned that in 2018 the project was not initiated in South Africa because there was no sponsor for the cities in South Africa. She further mentioned that the project was initiated in Nigeria where there was a sponsor for the project. Respondent 1 asserted the following:

> "*So, it's all dependent on the funding like in 2018 in South Africa, we didn't do Project A because we didn't have a funder but we had a funder for Project A in Nigeria and we did 2 cohorts in Nigeria. So, we trained 40 people in Nigeria. This year the funder wants to train another 100 people in Nigeria*."

Measure of success

Success is measured by the achievement of the goals and objectives of the project. This was illustrated by the statements below:

Respondent 2 stated the following:

> *"The task was to get people who didn't have the opportunity and give them a job"*

Responded 1 posited the following:

> *"Job placement as a measurement everything else we can't measure or we can't really figure out how to measure how do you measure behavior change, we can say maybe we can give people questionnaires to say can you talk of course not. Like how would we assess a person before a session and afterwards I think we only assess on we make people write a benchmark test on"*

Respondent 2 also said the following:

> *"The mandate to bring young people to the workplace has been accomplished because we took people who were not really doing anything and we put them in a space where they were exposed to first of all a big brand and they exposed to the digital industry."*

Respondent 3 stated:

> *"So, the project was a success. And one community where we actually reached the best numbers was in KZN wherein KZN we had all 25 participants graduating"*

The other measurement was the actual use of the skills developed as well as the long-term benefits gained by the beneficiaries. When asked about the successes that were measured, Respondent 3 answered:

> *"Case studies… we work very closely with the people that have gone through our programs, we have testimonials and the case studies that we work with basically assess the person from where they started and when the ended"*

4.4 DISCUSSION

The main aim of this research was to explore the determinants of the adoption of ICT4D projects. This Section deliberated the findings in relation to the literature about ICT4D project adoption. The objective was to corroborate the findings with the literature. This Section was structured according to the research sub-questions. These research questions (Section 1.3) are as follows:

- What factors should be considered when evaluating the success of an ICT4D project?
- What are the outcomes of the ICT4D project for the recipients?
- What were the lessons learnt from implementing the project?
- What are the beneficiaries' socio-economic gaps that still need to be filled?

4.4.1 Factors affecting success

In Section 2.5 the factors that were found to influence the success of ICT4D project adoption were participatory development and consideration of contextual settings. The projects initiated by Digify Africa were mostly implemented through consideration of the contextual issues of South Africa. The projects considered the lack of digital skills and created opportunities for the unemployed. Participatory development was evident in a few of the projects. The factors will be discussed individually in this Section. Other factors revealed during the interviews will be discussed.

4.4.1.1 Participation Development

There was a lack of participation by the beneficiaries in the planning and implementation of all the ICT4D projects. The planning phase of each of the projects had no participation because most of the projects were implemented based on what Digify Africa's project managers and management believed were relevant for the beneficiaries. In one of the projects, the project managers consulted with potential employers. The projects included equipping the beneficiaries with digital skills.

The research findings revealed that the success of ICT4D is complex. One cannot conclude that PD will always influence the implementation of ICT4D projects. Only one project conducted research and involved the beneficiaries at the beginning of the project. However, the project was perceived to be successful by the project manager because the goals and the objectives of the projects were achieved.

PD is therefore subjective and was not always applicable for adoption as an ICT4D project. According to Maail *et al*. (2017), the development approaches should be aligned with community participation. Project C was the only project that applied this principle. The challenges, however, were mobilizing the youth of the communities to be part of the project. This finding was aligned with the findings by Thapa and Sæbø (2016).

The principles of PD were not applicable to the other projects because they did not target particular communities or societies, rather the target was predominantly black youth. This finding was particularly different from the findings in the literature review because most researchers emphasized the relevance of PD in ICT4D project adoption. These projects were developed according to the contextual issues rather than the participation of the beneficiaries in the planning and the implementation of the projects.

4.4.1.2 Contextualization

The research finding of this study was aligned with the studies conducted by other scholars as described in the literature review. There are two contextual factors identified in Section 2.7.1. These were social and infrastructure contextual issues.

In comparison to the findings from this study, social contextualization was applicable. The adoption of the ICT4D project for the Digify Africa projects was affected by the social context. The training programs addressed the issue of unemployment, which was applicable in the South African context.

Baelden and Van Audenhove (2015) mentioned that technology should focus the needs of the society in which they are implemented, and should be more practical. This principle was applicable in the ICT4D projects adopted by Digify Africa because the training conducted was applied. The youth seeking employment received social media skills in which they were given practical exercises. They were required to formulate social media campaigns for agencies, which were potential employees. This assisted the beneficiaries to be ready for employment. Entrepreneurs gained skills that they could utilize in their businesses. Therefore contextual factors are very imperative in the implementation of ICT4D.

4.4.2 Outcomes of the projects

The research question sought to explore what the long-term benefits for the beneficiaries were. One of the findings from the study was that there was limited follow-up with the beneficiaries of the projects. At the end of the training projects, the application of the principles learnt should be evident. This Section revealed the benefits received by the beneficiaries through the ICT4D projects implemented by Digify Africa. These are presented in Table 4.2 below:

Table 4.2: Projects' outcome

Project	Outcome
Project A	Employment of the youth Some beneficiaries used skills to start new businesses instead of getting employed
Project B	Employment of youth
Project C	Entrepreneurial ventures initiated. Training of pupils in the communities due to the training conducted through this project
Project D	Entrepreneurs equipped with digital skills.

Project	Outcome
	Increased customer base through digital marketing tools used

The project managers noted that despite having desirable outcomes, it was difficult to measure the behavioral transformation of individuals. The only method used to see if there was understanding of the principle taught, was to have an initial test at the beginning of the training and again at the end of the project to test if there was a difference in the performances of the beneficiaries. At the start and at the end of Project A and Project C, the beneficiaries were requested to write benchmark tests. This assisted in measuring the understanding if the beneficiaries understood the principles of the training they had received.

4.4.3 Challenges and lessons learnt

The research question to do with the lessons learnt was to allow the research respondents to reveal any weaknesses or failures of the projects. The lessons learnt are summarized as:

- The projects still needed to have appropriate structures and frameworks in place to allow the projects to have plans and success measurement structures
- There were no follow up measures that allowed for Digify Africa to assess if the beneficiaries were self-sustainable in the long run or not.
- Collaborations also affected the adoption of ICT4D projects. All the projects partnered with two or more organizations in either the training of the beneficiaries or their placement. One of the respondents asserted that this meant better communication with the other partners to ensure success and avoid the delay of the project.
- Digital skills were becoming more important because most industries are moving towards utilizing technology for various functions.
- Another lesson learnt that when implementing in a community it is important to partner with the people and the civil government structures of the community. This was relevant in Project C, which was implemented in communities, with little engagement from them. Moreover, the attendance of the targeted beneficiaries was lower than the number they expected.
- Project D targeted entrepreneurs and most of them had small enterprises. It was a challenge to maintain the numbers of people attending.

4.4.4 Socio-economic gaps that still need to be filled

This research question was to understand if there was room for improvement to address the socio-economic gaps, which included the need for funding for the beneficiaries to attend the training. One of the challenges stated by the respondents was the decrease in numbers of the training attendees as the projects progressed. Lack of finances was one of the contributors to this challenge. This finding relates to the finding made by Joseph (2013) who emphasized that income levels affected the adoption of ICT4D projects.

The attendance of some beneficiaries was low in one project because of the limited engagement with the civil government, which meant fewer people attended. The civil government, in this case, refers to the local municipalities and the councilors of the communities where the project was implemented. Although contextual issues may have been considered, the participation of locals would have assisted in attracting the targeted participants. This finding is aligned with the findings by Thapa and Sæbø (2016) as well as Zewge *et al*. (2015) who stated that most ICt4D projects fail due to the exclusion of the beneficiaries during the planning of the projects. This meant there is still a gap in the communities as some youth still did not obtain skills. However, to combat this issue, the project managers bridged this by encouraging the trained beneficiaries to train pupils from their local schools.

The other socio-economic issue emphasized by one of the project managers regarding employment was that although they equipped the beneficiaries with digital skills for employment purposes, there was an issue of whether the beneficiaries actually utilized these skills in the workplace. The main problem being there was an issue with agencies accepting these beneficiaries as employees

4.5 CONCLUSION

The findings and analysis of the research were presented in this chapter. Firstly, each project that was researched was described according to the responses from the project managers, who were the respondents. There was a target to interview five project managers, however, one declined to participate. Therefore, four projects were identified as part of a single embedded case study of Digify Africa.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This Chapter concludes the dissertation. The first objective was to determine whether the research aim, objectives and questions were achieved. The second objective was to summarize and conclude the key findings of this research. The third objective was to describe the research limitations and provide suggestions for future research.

5.2 RESPONSES TO THE RESEARCH PROBLEM, OBJECTIVES AND QUESTIONS

The main aim of the study was to explore was to explore the uptake and deployment of ICT4D projects from the ICT4D project implementers' perspective to provide an outline for project implementation. To recap, the research sought to answer the following research question:

Main research question

What are the factors affecting ICT4D projects uptake and deployment at Digify Africa from the implementers' perspectives?

Research sub-questions

The research sub-questions are as follows:

- What are factors that should be considered when evaluating the success of an ICT4D project?
- What are the outcomes of the ICT4D project for the recipients?
- What were the challenges experienced and the lessons learnt while implementing the project?
- What are the beneficiaries' socio-economic gaps that still need to be filled?

Research objectives:

- To explore the project implementers' perspective about the factors that should be considered to evaluate the success of an ICT4D project.
- To explore the outcomes of the ICT4D project for the recipients
- To explore challenges experienced and lessons learnt in implementing the projects.
- To explore the socio-economic gaps that still need to be met.

These questions as illustrated in Section 4.4 were answered through the findings.

5.3 SUMMARY OF THE RESEARCH FINDINGS

The findings of the research were first, that ICT4D project adoption was mostly through training the beneficiaries. The skills obtained by the beneficiaries were digital skills to either gain employment or to use in a business.

Participative Development (PD) was not applied at the start of the projects. There were different reasons cited, which included:

- The project was employment-based where the employing agencies were consulted to establish the skills required by their organizations.
- The project was initiated by a client who requested employees with a particular skill.
- The digital skills were based on the requirements of the sponsor, who was a social media organization. The organization had particular skills they wanted the entrepreneurs to learn from the training
- They did not think it was important to consult the communities as they already had a curriculum.

In this light, the issue of Participative Development is subjective. In two projects, Project A and B, Participative Development was not applicable at the beginning because the beneficiaries were to gain employment and only relevant individuals were selected to be part of the projects. However, for Project C and D, it was imperative to do involve beneficiaries in planning and implementing the projects because the challenges they faced were that fewer people actually adopted ICT4D in some of the areas where the projects were initiated. There were fewer beneficiaries in comparison to the numbers they were targeting.

The contextual issues were considered for all the projects. The research was conducted in Project C to understand the needs of the beneficiaries. Unemployment is an enormous issue in South Africa so, the adoption of ICT4D projects was to address this through providing employment opportunities and entrepreneurial training.

The other finding was that collaboration was imperative for the adoption of the projects because for all the projects there were partners or donors.

The outcomes of the projects can be summarized as follows:

- Youth employment
- Starting of businesses
- Pupils in peri-urban areas were also trained in digital skills.
- Entrepreneurs were equipped with digital skills
- An increased customer base through the use of digital marketing tools.

The findings are summarized in the conceptual framework below:

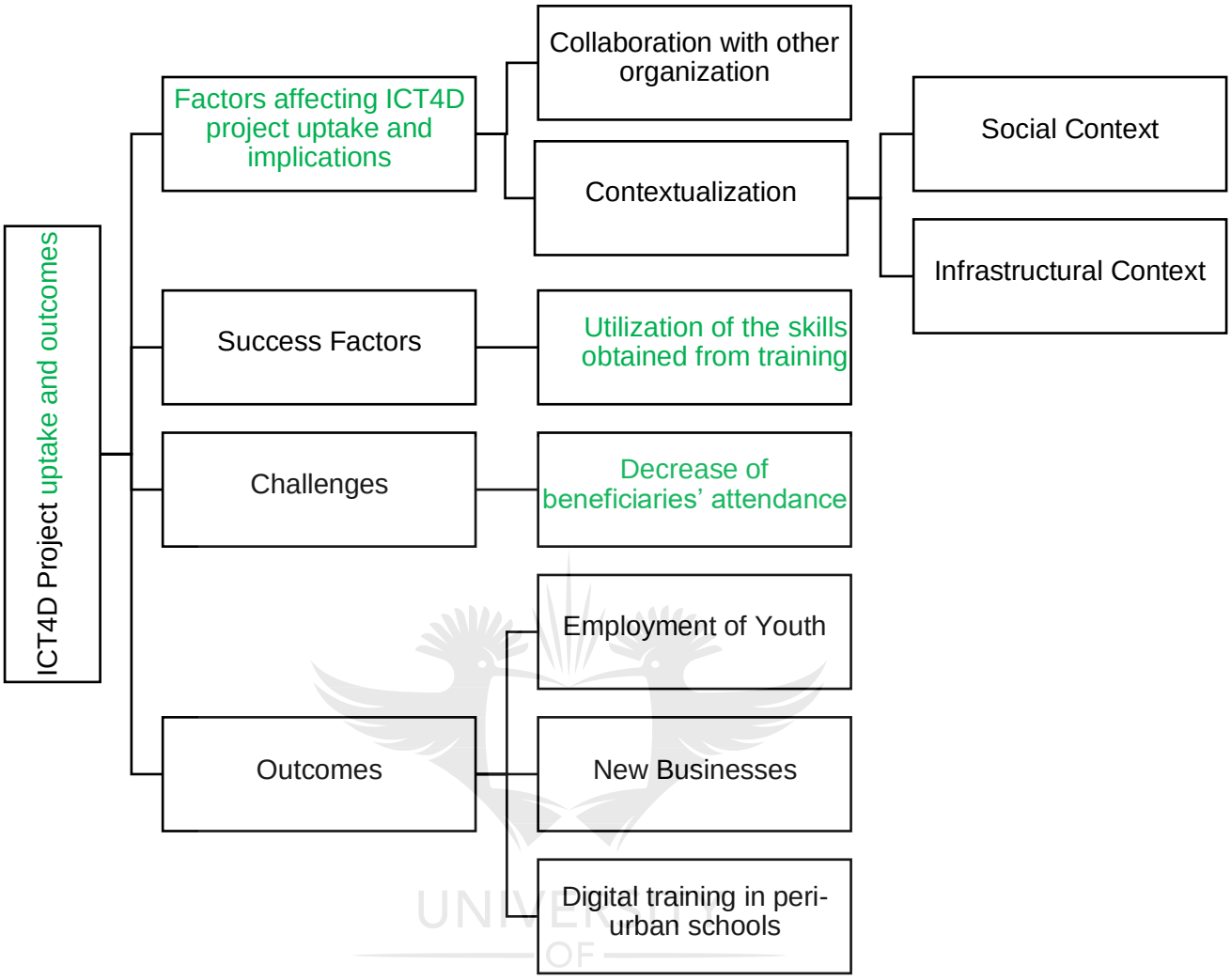


Figure 5.1: Conceptual framework findings (Source: Author's own work compilation, 2019)

5.4 RESEARCH METHODOLOGY

The onion ring was used to reveal the research methods and design of this research study. The researcher's philosophy was interpretivism where the opinions, experiences and perceptions of the project managers obtained through interviews were utilized as a source of data. The research was deductive as the information obtained from the literature review was compared to the findings of the research.

The research method was qualitative and the data collection utilized was in-depth interviews. The project managers from Digify Africa were interviewed about their experiences with the adoption of the ICT4D projects in their organization.

The research strategy was a case study, where a real-life application of ICT4D was explored through Digify Africa. The time horizon was cross-sectional and the research was conducted

once off. The data analysis used was thematic data analysis. There were four different responses from the four respondents representing the four projects. So, data was clustered according to each project, then clustered according to the themes identified in the literature review. This made it easier to gain an understanding of the findings of the research.

The data analysis utilized the thematic analysis. In summary, the steps for this were as follows:

1. Selection of relevant connotations (disassembling)
2. Definition of themes (reassembling)
3. Data interpretation
4. Making conclusions

5.5 MANAGERIAL IMPLICATIONS AND RECOMMENDATIONS

The purpose of this is to provide the implication and recommendations regarding the factors that affect the uptake and deployment of ICT4D. Contextual issues are very important in the uptake and implementation of ICT4D project because the services offered by the projects may not be adopted by the beneficiaries. In the planning of the project, the implementers must study the contexts in which they are will deploy the projects to ensure that the ICT4D project is adopted and sustainability is maintained. This is depicted in both the beneficiaries' perspective found in other studies depicted in Chapter 2 and the project implementers' perspectives.

The project implementers must create collaborative relationships because the uptake of ICT4D is also affected by partnerships with other organizations. In the findings all the project were in collaboration with at least one organization. This is indicative of the importance of creating collaborative relationships because it affect the deployment of ICT4D. The operation of ICT4D project is vastly affected by collaboration. In addition collaborative relationships are important in terms of obtaining funding for the project to be deployed.

There is a disparity between the findings and literature in the terms of Participative Development. User involvement is important in the adoption of ICT4D projects, however the findings conveyed for some of the projects is was not important because the projects were delivering skills that were based on the employers' skills demand. It is important to note however that one of the projects conveyed the importance of user involvement in adoption of ICT4D. Therefore initiators must assess the importance of when Participative Development is relevant for the initiative of the project that will be implemented.

5.6 LIMITATIONS OF THE STUDY

The limitations were addressed in Sections 1.6 and 3.8.6: thus, this Section provides some of the challenges in the scope of the research project. The data was collected from four project managers who were in charge of the implementation of the ICT4D projects. This information was limited to the project managers' perspectives and member checking was not conducted due to time contraints.

The project managers were not aware of the term ICT4D and therefore some of the principles relating to ICT4D were not familiar to them.

The nature of the research was a limitation because it is qualitative research, and the information provided could be biased and not an accurate depiction.

5.7 RECOMMENDATIONS FOR FUTURE STUDIES

Future research could be the determinants of ICT4D projects from the perspective of the beneficiaries. This would assist in giving a picture of the adoption of ICT4D. There should be followed-up with the beneficiaries of the projects to establish if the training was beneficial or not.

A research study emphasizing the importance and the benefits of ICT4D could also be another avenue for future studies. ICT4D is a very wide discipline and lately, there is a rise in micro-jobs through online platforms. Research into the influences and challenges of these online platforms in the South African context would be important as this creates a new job market.

REFERENCES

Adiyarta, K., Napitupulu, D., Nurdianto, H., Rahim, R. & Ahmar, A. (2018). User acceptance of E-Government Services Based on TRAM model. In *IOP Conference Series: Materials Science and Engineering*, 352(1):1-10.

Andoh-Baidoo, F. (2016). Organizational information and communication technologies for development. *Information Technology for Development*, 22(2):193.

Asongu, S.A. & Le Roux, S. (2017). Enhancing ICT for inclusive human development in sub-Saharan Africa. *Technological Forecasting & Social Change*, 118:44-54.

Aswani, R., Ilalvarasan, P.V., Kar, A.K. & Vijayan, S. (2018). Adoption of public Wi-Fi using UTAUT2: An exploration in an emerging economy. *Procedia Computer Science*, 13(2):297-306.

Avgerou, C. (2008). Discourses on innovation and development in information systems in developing countries' research. *Journal of Information Technology*, 23(3):133-146.

Avgerou, C. (2010). Discourses on ICT and development. *Information Technologies & International Development*, 6(3):18.

Ayoung, D.A., Abbott, P. & Kashefi, A. (2016). The Influence of Intangible ('Soft') Constructs on the Outcome of Community ICT Initiatives in Ghana: A Gap Archetype Analysis. *The Electronic Journal of Information Systems in Developing Countries*, 77(1):1-22.

Baduza, G. & Khene, C. (2017). A needs-ICTD strategy alignment foundation for the measurement of ICTD impact: Three case studies in South Africa. *African Journal of Information Systems*, 9(2):128-148.

Baelden, D. & Van Audenhove, L. (2015). Participative ICT4D and living lab research: The case study of a mobile social media application in a rural Tanzanian University setting. *Telematics and Informatics*, 32(4):842-852.

Bankole, F. (2017). ICT infrastructure and its impact on national development: A research direction for Africa. *African Journal of Information Systems*, 9(2):77-101.

Bon, A. & Akkermans, H. (2014). Rethinking technology, ICTs and development: Why it is time to consider ICT4D 3.0. *The Network Institute VU University, Amsterdam*.

Bon, A., Akkermans, H. & Gordijin, J. (2016). Developing ICT services in a low-resource development context. *CSIMQ*, 9:84-109.

Bornman, E. (2016). Information society and digital divide in South Africa: results of longitudinal surveys. *Information, Communication & Society*, 19(2):264-278.

Breytenbach, J., De Villiers, C. & Jordaan, M. (2013). Communities in control of their own integrated technology development processes. *Information technology for development*, 19(2):133.

Cape Digital Foundation, (2016). About CDF. http://digitalfoundation.org.za/. (Accessed 12 August 2017)

Clarke, S., Wylie, G. & Zomer, H. (2013). ICT 4 the MDGs? A perspective on lCTs' role in addressing urban poverty in the context of the millennium development goals. *Information technologies & international development*, 9(4):70.

Conger, S. (2015). Knowledge management for information and communications technologies for development programs in South Africa. *Information Technology for Development*, 21(1):113-134.

Creswell, J.W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Washington DC: Sage publications.

Csíkszentmíhalyi, C., Mukundane, J., Rodrigues, G. F., Mwesigwa, D. & Kasprzak, M. (2018). *The Space of Possibilities: Political Economies of Technology Innovation in sub-Saharan Africa. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*: 306. ACM.

Da Silva, A.P. & Fernández, W.D. (2016, January). *Sustainability of ICTD Projects and Its Influencing Factors: A Comprehensive Literature Review.* In *2016 49th Hawaii International Conference on System Sciences (HICSS)* IEEE*:* 2718-2727.

De´, R., Pal, A., Sethi, R., Reddy, S.K. & Chitre, C. (2018). ICT4D research: A call for a strong critical approach. *Information Technology for Development*, 24(1):63-94.

Devex Impact Editor, (2013). The five key challenges in implementing ICT for development. https://www.devex.com/news/the-five-key-challenges-in-implementing-ict-for-development-82499 (Accessed 16 September, 2019)

Diaz Andrade, A., Techatassanasoontorn, A. & Singh, H. (2017). *Phenomenology: Understanding the ICT4D experience. Twenty-third Americas Conference on Information Systems, Boston, USA.*

Digify, (2018). Livity Africa will now be known as Digify Africa. https://www.bizcommunity.com/Article/196/16/179412.html (Accessed 20 September 2019)

Dimagi. (2018). A brief history of ICT4D. https://www.dimagi.com/blog/ict4d-brief-history/. (Accessed 18 May 2019).

Diniz, E.H., Bailey, D.E. & Sholler, D. (2014). Achieving ICT4D project success by altering context, not technology. *Information Technologies & International Development*, 10(4):29.

Du Plooy-Cilliers, F., Davis, C. & Bezuidenhout, R. (2014). *Research Matters*. 1st edition. Cape Town: Juta

Farquhar, J.D. (2012). *Case study research for business*. London England: Sage.

Egessa, M., Liyala, S. & Ogara, S. (2018). *What theory of change can contribute to capability approach: towards evaluating ICT-enabled interventions*? In *2018 IST-Africa Week Conference (IST-Africa)* (pp. Page-1). IEEE.

Gaur, A. & Avison, A. (2015). *Women and ICT-Enabled Well-Being: Inclusive Innovation by Micro Financial Institutions in India*. *Proceedings of the 13th International Conference on Social Implications of Computers in Developing Countries, Negombo, Sri Lanka*.

Gephart Jr, R.P. (2017). Qualitative research as interpretive social science. In *The SAGE handbook of qualitative business and management research methods: History and traditions*: 33-53. Edited by Cassell, C., Cunliffe, A. L., & Grandy, G. London: SAGE Publications

Grbich, C. (2012). *Qualitative data analysis: An introduction*. Thousand Oaks, CA: Sage.

Gwaka, L.T., May, J. & Tucker, W. (2018). Towards low-cost community networks in rural communities: The impact of context using the case study of Beitbridge, Zimbabwe. *The Electronic Journal of Information Systems in Developing Countries*, 84(3):e12029.

Hair, J.F. (2016). *Essentials of business research methods.* 3rd Edition. New York: Routledge.

Harris, R.W. (2016). How ICT4D research fails the poor. *Information Technology for Development*, 22(1):177-192.

Hatakka, M., Devinder, T. & Sæbø, Ø. (2016). A framework for understanding the link between ICT and development: How affordances influence capabilities. In *SIG GlobDev*, Dublin, December 11 2016.

Hatakka, M., Thapa, D. & Zhang, J. (2018). Introduction to the Minitrack on Information and Communication Technology for Development (ICT4D): ICT and Sustainable

Development. *In Proceedings of the 51st Hawaii International Conference on System Sciences.* January 2017 Hawaii.

Hayes, N. & Westrup, C. (2012). Context and the processes of ICT for development. *Information and organization*, 22(1):23-36.

Heeks, R. (2008). ICT4D 2.0: The next phase of applying ICT for international development. *IEE Computer,* 41(6):26–33.

Heeks, R. (2009). The ICT4D 2.0 Manifesto: Where Next for ICTs and International Development? *Development Informatics Working Paper no.42*, IDPM, University of Manchester, UK.

Heeks, R. (2009). The Godfather of ICT4D, and ICT4D's First Computer. https://ict4dblog.wordpress.com/tag/ict4d-history/. (Accessed October 2017)

Heffernan, C., Lin, Y. & Thomson, K. (2016). Drawing from development: Towards unifying theory and practice of ICT4D. *Journal of international development*, 28(6):902-918.

Hennink, M.M., Hutter, I. & Bailey, A. (2011). *Qualitative research methods*. Los Angeles: Sage.

Hilbert, M. (2012). Toward a conceptual framework for ICT for development: Lessons learned from the cube framework used in Latin America. *Information Technologies & International Development*, *8*(4):243-259.

Hosman, L.J. & Armey, L.E. (2017). Taking technology to the field: hardware challenges in developing countries. *Information Technology for Development*, 23(4):648-667.

Hoyng, R. (2016). A socio-technical contract: Network governance and ICT4D in Turkey. *Telematics and Informatics*, 33(1):139-149.

Hudson, S. (2018). Future Development as Freedom: The Capability Approach, Irrational Intuitions, and the Role of Emerging Technologies in Global Justice. *Annals of the University of Bucharest-Philosophy Series*, *66*(2):117-135.

Indices of Social development. (n.d). Defining social development. http://www.indsocdev.org/defining-social-development.html . (Accessed 18 May 2019)

Jha, S.K., Pinsonneault, A. & Dub, L. (2016). The evolution of an ICT platform-enabled ecosystem for poverty alleviation: The case of Ekutir. *MIS Quarterly,* 40(2):431-446.

Jiménez, A. & Zheng, Y. (2018). Tech hubs, innovation and development. *Information Technology for Development*, 24(1):95-118.

Joseph, M.K. (2013). African Women and ICTs GB: NBN International.

Karanasios, S. & Allen, D. (2013). ICT for development in the context of the closure of Chernobyl nuclear power plant: An activity theory perspective. *Information Systems Journal*, 23(4):287-306.

Kassongo, R.F., Tucker, W.D. & Pather, S. (2018). Government facilitated access to ICTs: adoption, use and impact on the well-being of indigent South Africans. In *2018 IST. Africa Week Conference (IST-Africa)*:1. IEEE.

Kayisire, D. & Wei, J. (2016). ICT adoption and usage in Africa: Towards an efficiency assessment. *Information Technology for Development*, *22*(4):630-653.

Keijdener, M. N. C., Overbeek, S. J., & España, S. (2018). Scalability factors in an ICT4D context: A literature review. In *Proceedings of the 5th International Symposium" Perspectives on ICT4D"(P-ICT4D 2018) co-located with 10th ACM Web Science Conference (WebSci'18), Amsterdam, the Netherlands, May 27, 2018.* 2120(1). Sun SITE Central Europe.

Klenke, K., Martin, S. & Wallace, J.R. (2015). *Qualitative research in the study of leadership*. 2nd Edition. United Kingdom: Emerald Publishing.

Krauss, K.E.M. (2017). A confessional account of community entry: Doing critically reflexive ICT4D work in a deep rural community in South Africa. *Information Technology for Development*, 24 (3):482-510.

Lehong, S., Van Biljon, J. & De Kock, E. (2018). *Knowledge sharing platforms in ICT4D: towards best practices for evaluation. 2018 Conference on Information Communications Technology and Society (ICTAS)*. IEEE Explore: 194-199.

Lin, C.I. & Myers, M.D. (2015). Extending ICT4D studies: The value of critical research. *MIS Quarterly*, 39(3):697-712.

Lomazzi, M., Borisch, B. & Laaser, U. (2014). The Millennium Development Goals: experiences, achievements and what's next. Global health action, 7:23695. doi:10.3402/gha.v7.23695.

Lopez, D., Franquesa, D., Navarro, L., Sanchez, F., Cabré, J. & Alier, M. (2015). *Participatory learning process through ICT4D projects. In Proceedings of the 3rd International Conference on Technological Ecosystems for Enhancing Multiculturality*: 553-557).

Lopez, D., Franquesa, D., Navarro, L. & Sanchez, F. (2012). ICT4D projects as a tool for service learning. *Procedia - Social and Behavioral Sciences*: 1-5.

Loudon, M. & Rivett, U. (2011). Enacting openness in ICT4D research. *Information technologies & international development*, 7(1):33-46.

Maail, A.G. (2011). User participation and the success of development of ICT4D project: A critical review. In *Proceedings of SIG GlobDev 4th annual workshop* (18).

Maail, A.G., Kurnia, S. & Chang, S. (2017). Enhancing Social Inclusion through Optimal Community Participation Levels in ICT4D Projects. In *Social Inclusion and Usability of ICT-enabled Services*. 83-106. Edited by Choudrie, J., Tsatsou, P. & Kurnia S. New York: Routledge.

Mabila, J., Van Biljon, J. & Herselman, M. (2017). A sustainability framework for mobile technology integration in schools: The case of resource-constrained environments in South Africa. *The Journal of Community Informatics*, 13(2):59-86.

Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education*, 9(3):3351-33514.

Mamba, M.S.N. & Isabirye, N. (2015). A framework to guide development through ICTs in rural areas in South Africa. *Information Technology for Development*, 21(1):135-150.

Manara, H. & Gelderblom, H. (2016). Sustainability of ICT4D projects: Case study of mobile cinemas in rural South Africa. In *2016 IST-Africa Week Conference*: 1-8.

Marais, M.A. (2011). *Analysis of the factors affecting the sustainability of ICT4D initiatives. ICT for development: people, policy and practice*. *IDIA2011 Conference Proceedings*: 100-120.

Marais, M. A., & Meyer, I. (2015). Design for sustainability: countering the drivers of unsustainability in development projects.

Marangunić, N. & Granić, A. (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1):81-95.

Mashinini, M.J. & Lotriet, H.H. (2011). Towards understanding the contextual role of traditional leadership in the establishment of cyber communities amongst rural people in South Africa: The case of Dr J.S. Moroka Municipality. *International Journal of African Renaissance Studies,* 6(2):55-70.

Mavengere, N. & Ruohonen, M. (2016). ICT4D 2.0 studies in virtual environment: Context and user needs to foster learning process. *2016 IST-Africa Week Conference*, IST-Africa Week Conference: 1-8.

Maylor, H., Blackmon, K. & Huemann, M. (2016). *Researching business and management*. 2nd Edition. London: Macmillan International Higher Education.

Mbuyisa, B. & Leonard, A. (2017). The role of ICT use in SMEs towards poverty reduction: A systematic literature review. *Journal of International Development*, 29(2):159-197.

McDermott, M.S., Oliver, M., Simnadis, T., Beck, E.J., Coltman, T., Iverson, D. & Sharma, R. (2015). The Theory of Planned Behavior and dietary patterns: A systematic review and meta-analysis. *Preventive Medicine*, 81:150-156.

Merriam, S.B. & Tisdell, E.J. (2015). *Qualitative research: A guide to design and implementation: The Jossey-bass higher and adult education series*. 4th Edition. San Francisco, CA: John Wiley & Sons.

Mouton, J. (2013). *How to Succeed in Your Master's and Doctoral Studies: A South African Guide and Resource Book.* Pretoria: Van Schaik Publishers.

Mthoko, H. & Khene, C. (2017). Building theory in ICT4D evaluation: A comprehensive approach to assessing outcome and impact. *Information Technology for Development*, 24(1):138-164.

Mushiba, M., Winschiers-Theophilus, H., Du Preez, V., Molokwane, S. & Kölhi, J. (2015). *Academia's responsibilities in community-based co-creation education–a critical review of two cases in South Africa and Botswana. In Proceedings of the 13th International Conference on Social Implications of Computers in Developing Countries, Negombo, Sri Lanka*.

Musiyandaka, D., Ranga, G. & Kiwa, J.F. (2013). An analysis of factors influencing success of ICT4D projects: A case study of the schools' computerisation programme in Mashonaland West province, Zimbabwe. *The Journal of Community Informatics,* 9(4):1-4.

Mzekandaba, S. (2018). Minister calls for more public Wi-Fi zones. https://www.itweb.co.za/content/GxwQDM1AXVpMlPVo (Accessed 10 June 2019).

Nipo, D.T., Bujang, I. & Ting, S.K. (2014). Global digital divide: Determinants of cross-country ICT development with special reference to Southeast Asia. *International Journal of Business & Economic Development*, 2(3):83-95.

Njihia, J. & Merali, Y. (2013). The broader context for ICT4D projects: A morphogenetic analysis. *MIS Quarterly*, 37(3):881-905.

Njoh, A.J. (2018). The relationship between modern information and communications technologies (ICTs) and development in Africa. *Utilities Policy*, 50:83-90.

Ntawanga, M.R & Felix, F. (2013). A roadmap for rural area ICT solution deployment: A case of Kgautswane community in South Africa. *African Journal of Information Systems*, 5(2):49-64.

Nuseibeh, H.Z., Hevner, A.R. & Collins, R.W. (2017). What can be controlled: Actionable ICT4D in the case of Palestine? *Information Technology for Development*, 24 (1):1-34.

Ochara, N.M. & Mawela, T. (2015). Enabling social sustainability of E-participation through mobile technology. *Information Technology for Development*, 21(2):205.

Oelen, A., van Aart, C. J., & De Boer, V. (2018). Measuring Surface Water Quality Using a Low-Cost Sensor Kit within the Context of Rural Africa. In *P-ICT4D@ WebSci*.

Ojo, T. (2016a). Global Agenda and ICT4D in Africa: Constraints of localizing universal norm. *Telecommunications policy*, 40:704-713.

Ojo, T. (2016b). Neo-Gramscian Approach and Geopolitics of ICT4D Agenda. *Global Media Journal: Canadian Edition*, 9(1):3-35.

Okon, U. (2015). ICT for rural community development: Implementing the communicative ecology framework in the Niger Delta region of Nigeria. *Information technology for development,* 21(2):297.

Paley, J. (2016). *Phenomenology as Qualitative Research: A Critical Analysis of Meaning Attribution Abingdon*, Oxon; New York, NY: Routledge.

Palvia, P., Baqir, N. & Nemati, H. (2018). ICT for socio-economic development: A citizen's perspective. *Information & Management*, 55(2):160-176.

Pavel, A. P., Fruth, A. & Neacsu, M.N. (2015). ICT and e-learning–catalysts for innovation and quality in higher education. *Procedia economics and finance*, 23:704-711.

Pouezevara, S., Mekhael, S.W. & Darcy, N. (2014). Planning and evaluating ICT in education programs using the four dimensions of sustainability: A program evaluation from Egypt. *International Journal of Education and Development using Information and Communication Technology,* 10(2):120-141.

Qureshi, S. (2015). Are we making a better world with information and communication technology for development (ICT4D) research? Findings from the field and theory building*. Information Technology for Development,* 21 (4):511-522.

Ramadani, L., Kurnia, S. & Breidbach, C.F. (2018). In Search for Holistic ICT4D Research: A Systematic Literature Review. In *Proceedings of the 51st Hawaii International Conference on System Sciences*.

Ramirez-Robles, M., Jimenez-Castellanos, A., Khalifa, A., Anne, A., Kamga, Y., Afagbedzi, S.K. & Maojo, V. (2013). Africa Build portal: Developing a social network of African health researchers and educators. *2013 IST-Africa Conference & Exhibition*: 1-8.

Remler, D.K. & Van Ryzin, G.G. (2015). *Research methods in practice: strategies for description and causation*. 2nd Edition. Los Angeles: Sage.

Rey-Moreno, C., Sabiescu, A.G., Siya, M.J. & Tucker, W.D. (2015). Local ownership, exercise of ownership and moving from passive to active entitlement: A practice-led inquiry on a rural community network. *The Journal of Community Informatics*, 11(2):1-16.

Richards, L. (2015). *Handling qualitative data: A practical guide*. Los Angeles: Sage.

Rislana, K., Good, A., Adams, C. & Scott, P. (2016). The Role of ICT Education and Trainings in Poverty Reduction and Economic Empowerment: A Case Study of Jigawa State Government ICT4D Intervention. *Academic Conferences & Publishing International Ltd:* 177-186.

Rivett, U. (2017). University of Cape Town South Africa Chanel (2017). Professor reflects on ICT4D research. Available from: https://www.youtube.com/watch?v=xh5vx82pqig. (Accessed 10 August 2018)

Robson, C. (2011). *Real world research: A resource for social-scientists and practitioner-researchers*. 3rd Edition. Oxford: Blackwell Publishing.

Rothe, F. (2018). ICT for Development in a Post-2015 World: How to Conceptualize ICT4D in the Context of the Sustainable Development Goals. *P-ICT4D@WebSci*.

Rouse, M. (2011). ICT4D (Information and Communications Technologies for Development).*What is.com blog?*

Sahay, S. & Mukherjee, A. (2017). *International Conference on Social Implications of Computers in Developing Countries. Conference Proceedings of the Xth Conference held in Y. Springer*.

Sahay, S., Sein, M.K. & Urquhart, C. (2017). Flipping the context: ICT4D, the next grand challenge for IS research and practice. *Journal of the Association for Information Systems*, 18(12):837-847.

Sahu, P.K. (2013). *Research methodology: A guide for researchers in agricultural science, social science and other related fields*. New Delhi: Springer

Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research Methods for Business Students.* 7th edition. Essex, England: Pearson Education Limited.

Sen, A. (1993). Capability and well-being. *The quality of life*, 30.

Singh, J.P. & Flyverbom, M. (2016). Representing participation in ICT4D projects. *Telecommunications policy*, 40:692-703.

Sobiecki, G. (2013). Institutional environment for ICT utilization in rural India. *Annals of Agricultural Economics and Rural Development,* 4(100):114-124.

Souter, D. (2016). Inside the Information Society: A short history of ICT4D. Available from: https://www.apc.org/en/blog/inside-information-society-short-history-ict4d (Accessed 5 September 2017).

Stats SA (2019). http://www.statssa.gov.za/ (Accessed 11 March 2019)

Szekely, E. & Mason, M. (2018). Complexity theory, the capability approach, and the sustainability of development initiatives in education. *Journal of Education Policy*: May: 1-17 https://doi.org/10.1080/02680939.2018.1465999

Tas, E.M. (2011). ICT education for development — a case study. *Procedia Computer Science*, 3:507–512.

Thapa, D. & Sæbø, Ø. (2016). Participation in ICT Development Interventions: Who and How? *The Electronic Journal of Information Systems in Developing Countries*, *75*(1):1-10.

Thapa, D. & Sb, Y. (2015). *International Conference on Social Implications of Computers in Developing Countries: 20/05/2015-22/05/2015. Conference proceedings of the Xth conference held in Y*.

Thomas, M. A., Li, Y. & Oliveira, T. (2017). Nuances of development contexts for ICT4D research in least developed countries: An empirical investigation in Haiti. *Telematics and Informatics*, 34(7):1093-1112.

Trafimow, D. (2009). The Theory of Reasoned Action. *Theory & Psychology*, 19(4):501-518.

T-systems (2012). Contributing in addressing the skills shortage of employable graduates in the ICT market. https://www.t-systems.com/za/en/career/ict-academy/ict-about-us/build-your-ict-skills-461630. (Accessed 4 April 2017).

Turpin, M. (2018). Assessing South African ICT4D research outputs: A Journal Review. *South African Computer Journal*, 30(1):108-127.

Vinney, C. (2018). Social cognitive theory: How we learn from the behavior of others. https://www.thoughtco.com/social-cognitive-theory-4174567. (Accessed 13 May 2019)

Walliman, N. (2017). *Research Methods: The Basics*. Florence: Routledge.

Walsham, G. (2017). ICT4D research: Reflections on history and future agenda. *Information Technology for Development*, 23(1):18-41.

Walton, R. (2013). How trust and credibility affect technology-based development projects. *Technical communication quarterly*, 22(1):85-102.

Walton, M. & Heeks, R. (2011). Can a Process Approach improve ICT4D Project Success? *Development Informatics* Working Paper no.42, IDPM, University of Manchester, UK.

Wilson, J. (2014). *Essentials of business research: A guide to doing your research project*. Los Angeles: Sage.

Wingo, N.P., Ivankova, N.V. & Moss, J.A. (2017). Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning*, 21(1):15-35.

Van Dyk, G. (2016). School pilots digital edu system. https://www.news24.com/SouthAfrica/Local/Peoples-Post/school-pilots-digital-edu-system-20161017 (Accessed 11 September 2019)

Yin, R.K. (2016). *Qualitative Research from Start to Finish*, 2nd Edition. New York: The Guilford Press.

Yin, R.K. (2012). *Applications of case study research*. Los Angeles: Sage.

Zewge, A., Dittrich, Y. & Bekele, R. (2015). *AFRICON, 2015. Conference proceedings of the Xth conference held in Y. IEEE.*

Zheng, Y., Hatakka, M., Sahay, S. & Andersson, A. (2017). Conceptualizing development in information and communication technology for development (ICT4D). *Information Technology for Development*, 24(1):1-14.

APPENDICES

APPENDIX A: ETHICS CLEARANCE

UNIVERSITY OF JOHANNESBURG

CBE RESEARCH ETHICS COMMITTEE

Dear N Nyoni & Ms S Bvuma

ETHICAL CLEARANCE GRANTED FOR RESEARCH PROJECT

This letter serves to confirm that the proposed research project has been granted ethical clearance by the School of Consumer Intelligence and Information Systems Ethics committee at the University of Johannesburg. Please refer to the report below for the ethical clearance number and specified conditions of approval.

ETHICAL CLEARANCE REPORT

Applicant	Ntombiyokusa Nyoni
Supervisor	Ms S Bvuma
Student/staff number	216014534
Title	Determinants of Information Communication Technology for Development adoption in a South African project
Decision date at meeting **Decision at Department / School** **Decision at College Meeting** **Decision at CBE REC**	15 April 2019 School of Consumer Intelligence and Information Systems Ethics Committee (Sub-committee of CBEREC)
Reviewers	SCiiS ethics committee members
Ethical clearance code	2019SCiiS05
Rating of most recent application	CODE 02

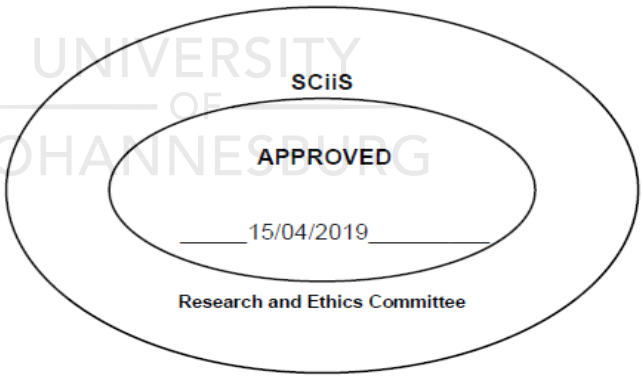
CODE 01 - Approved

CODE 02 - Approved with suggestions without re-submission

CODE 03 - Not approved, may re-submit

CODE 04 - Not approved, no re-submission allowed

RESEARCH COMPLIES WITH	COMPLIANCE	NON-COMPLIANCE / DETAILS / RECOMMENDATIONS / CONDITIONS OF APPROVAL
The right to privacy, confidentiality and anonymity	Yes	The Researchers need to ensure participants' / research subjects anonymity is assured at all times.
The right to equality, justice, human dignity/life and protection against harm	Yes	
The right to freedom of choice, expression and access to information	Yes	
Right of the community and science community	Yes	
The researcher will not experience any harm in conducting the research	Yes	
Informed consent/letters of request	Yes	The permission letter must be sent to the committee for record-keeping purposes.



APPENDIX B: CONSENT LETTER FROM DIGIFY AFRICA

Re: Permission to conduct research (Ntombiyokusa Nyoni)

This letter serves to confirm that Digify Africa has granted Ms Ntombiyokusa Nyoni (216014534) a student at the University of Johannesburg permission to conduct research.

Ms Ntombi's research is on ICT4D and the use of technology to meet socio economic needs.

On behalf of Digify Africa I do hereby grant her the permission to conduct research with the Project Managers to answer her research question/s. As per her request she will conduct interviews with 5 Project Managers who are managing various projects within Digify Africa.

The consent to participate is entirely up to the Project Managers.

Should you require any information please contact Nomacala Mpeta using the following details:

Tel: 011 028 7487

Email: nomacala@livityafrica.com

I hope you find the above in order.

Sincerely,

Gavin Weale, MD and founder Digify Africa

WWW.DIGIFYAFRICA.COM
JHB 34, 4th Avenue, Melville, +27 11 028 7487

APPENDIX C: REQUEST FOR CONSENT

LETTER OF CONSENT –Research

I am a MCom Business Management student at the University of Johannesburg and I specialize in Applied Information Systems (AIS). I am currently conducting research which focuses on the factors influencing adoption of information communication technology for development (ICT4D) for the previously disadvantaged.

I would like to invite you, with your consent, to form part of this study. Your participation will be in the form of an interview. All data collected will be anonymous and stored in a secure environment. Your participation in this study is voluntary and you can withdraw from the study at any time. Being part of this study, you will be privy to the outcomes of the research.

I hereby request you to sign the attached document, in order to indicate that you are familiar with the conditions stated below and that you have consequently given your permission to take part in this inquiry. This letter must be signed and dated by you the participant as it forms part of the requirements for ethical research as mandated by the Ethics Committee of the Faculty of Management.

Thanking you in anticipation

Ntombiyokusa Nyoni

(Researcher)

APPENDIX D: PARTICIPANTS CONSENT FORM

CONSENT FORM PARTICIPANTS

I, the undersigned, (Mr/Mrs/Ms) ……., hereby indicate that I have read and understand the conditions for participation in the above-mentioned research as contained in this letter. I hereby give my written consent to complete the study, subject to the following conditions:

- Participants will be afforded the opportunity to comment on the findings from the study.
- Participants will at all times be fully informed about the research process and purpose.
- Consent to participate in the research will be obtained on this letter signed by the participant.
- Participants will be at liberty to withdraw from the study at any time, without any pressure to provide reasons (voluntary participation).
- All possible means will be undertaken to ensure that participants are not caused any detriment by partaking in this study and a pseudonym will be allocated to all participants to protect identities and to guarantee that any information revealed, either personal or professional, will be regarded as absolutely confidential.
- Participants will not be exposed to any acts of deception or betrayal in the research process or its published outcomes.
- Faithfulness, keeping of agreements and loyalty in interpersonal relationships are central to the reputation of the researcher and individual participants.

_____ _____

Signature of participant Date

_____ _____

Signature of researcher Date

APPENDIX E: INTERVIEW QUESTIONNAIRE

Introduction

Greetings, this is an interview to assess your experiences in the training conducted by Digify Africa. This is part of a research to assess the determinants of ICT4D project adoption. Your contribution will be highly valuable to the research. Your participation in this research is voluntary and if you do not wish to participate in the research, you may decline.

Project Profile

Number of beneficiaries

_____

Please describe the ICT4D project/initiative?

_____
_____
_____
_____
_____
_____
_____

What are your duties in this project/initiative?

_____
_____
_____
_____
_____
_____

Project Planning

Do you involve any of the beneficiaries in the planning of the training project?

_____
_____

What were the goals of the project?

Who was the target for the training?

What would you say is the context where the project was initiated?

Project control/ monitor

In your opinion, was the project successful?

What measures did you use to assess the success of the project?

Do you use any framework in the implementation, planning and control of the ICT4D project?

YES	
NO	

If YES, what frameworks do you use?

If NO why not?

What improvements would you make on the training project?

What were the lessons learnt from the project?

Is there anything you would like to add?